The RUBBER AGE

February, 1942

★ THERMAX "S" ★

Developed for use in the loading and plasticizing of the Butadiene type

SYNTHETIC RUBBERS

Fast mixing and dustless. Requires little or no additional plasticizer. Good for smooth calendering and tubing

R. T. VANDERBILT CO., Inc.

230 Park Avenue, New York City

Newsletter No. 2 *PUBLISHED BY RUBBER CHEMICALS DIVISION OF* DU PONT *FEBRUARY 1942*

Conservation of Raw Materials and Production Time of Vital Importance to Rubber Industry

CONSERVATION of raw materials is the watchword of today—as it should be tomorrow when the emergency is over. In general, all rubber chemicals are conservation agents. Their use has reduced manufacturing costs and conserved rubber by preventing waste due to scorched stock. Further, the proper use of rubber chemicals results in higher quality stocks which last longer and need replacement much less frequently.

THE RPAs save badly needed time and equipment by increasing rubber breakdown speeds and improving processability.

The following results were obtained in the manufacture of carbon black masterbatch using 75 pounds of smoked sheets and 50 pounds of channel black:

PROCESS	*Time for Operation* *With 0.25% RPA*	*No RPA*
Masticate 75 pounds crude rubber	4 min.	12 min.
Rest or aging period	0	24 hours
Incorporate 50 pounds channel black	12 min.	20 min.
Mixing time 125-pound masterbatch	16 min.	32 min.

HELIOZONE PREVENTS SUNLIGHT DETERIORATION The normal life of products exposed to sunlight in service can be materially extended by including Heliozone in the compound. Accelerators and anti-oxidants, regardless of type, have very little effect on the sun-checking resistance of stretched rubber. A material, opaque to sunlight, that blooms to the surface will provide such protection.

Heliozone is a special blend of waxes that bloom to the surface of a cured rubber article, forming a smooth, continuous, transparent film that remains plastic even at 0°F. As the film does not dissolve in the rubber at high temperatures, Heliozone provides year-round protection.

For most purposes, satisfactory protection is obtained by the use of 0.5% Heliozone on the rubber; however, for maximum protection or in highly loaded stocks up to 2.0% on the rubber should be used. As Heliozone is not an antioxidant, Neozone A or another good antioxidant should be used with it.

Figure I illustrates photographically the superior sunlight resistance of a dark-colored stock containing 2.0% Heliozone on the rubber over the same stock without Heliozone. Both samples were stretched 50% and exposed to direct sunlight for 5 months.

FIGURE I

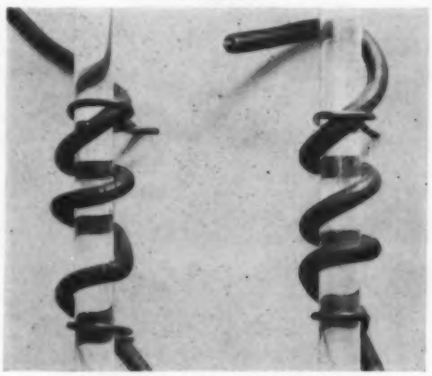
Contains 2% Heliozone on rubber

Contains no Heliozone

NEOPRENE All neoprene compositions are inherently superior to similar rubber stocks in resistance to deterioration by sunlight.

As can be seen from Figure II, the rubber jacketed cable (left) was badly cracked after 13 months exposure to sunlight; the neoprene jacketed cable (right) showed no signs of cracking after exposure for 26 months.

FIGURE II



Power Cable Exposed to Sunlight

Rubber Covered Exposed 13 Months — *Neoprene Covered Exposed 26 Months*

RETARDER W inhibits precure and scorching of thiuram and benzothiazole accelerated stocks at processing or storage temperatures. Many chemicals are known to inhibit vulcanization of rubber at all temperatures. However, Retarder W is a true retarder because it improves safety at processing temperatures but is a mild activator at curing temperatures.

One quarter to one half as much Retarder W as accelerator should normally be used. The effectiveness of Retarder W is reduced by the presence of alkali reclaims and it activates the thiazoline accelerator 2-MT.

Through the Mill

NEOPRENE TYPE CG *should be used for adhesive cements. It gives:*

1. *Strong initial bond,*
2. *Rapid rate of cure or set-up at room temperature,*
3. *High permanent bond strength when fully cured.*

USE ACCELERATOR 833 *to cure neoprene cements at room temperature. See recommndations on page 3 of informal report entitled "Neoprene Type CG."*

RUBBERIZED FABRICS, *either calendered or spread, may be efficiently, safely and economically cured in the roll instead of in festoons. For information and suggested compounds see informal report entitled "Roll Curing of Rubberized Fabrics."*

ACCELERATOR 808 *gives excellent results in stocks in which all the rubber hydrocarbon is in the form of reclaimed rubber. Thionex-litharge, Zenite-litharge, and Zenite B are also recommended in this type of compound.*

HELIOZONE *will improve the appearance of products containing reclaimed rubber. Use it for this reason as well as for sun-checking resistance.*

The Neoprene Notebook carries up-to-date information on new uses for neoprene. Ask to get on the mailing list.

Your rubber problems are never too big or too little for the

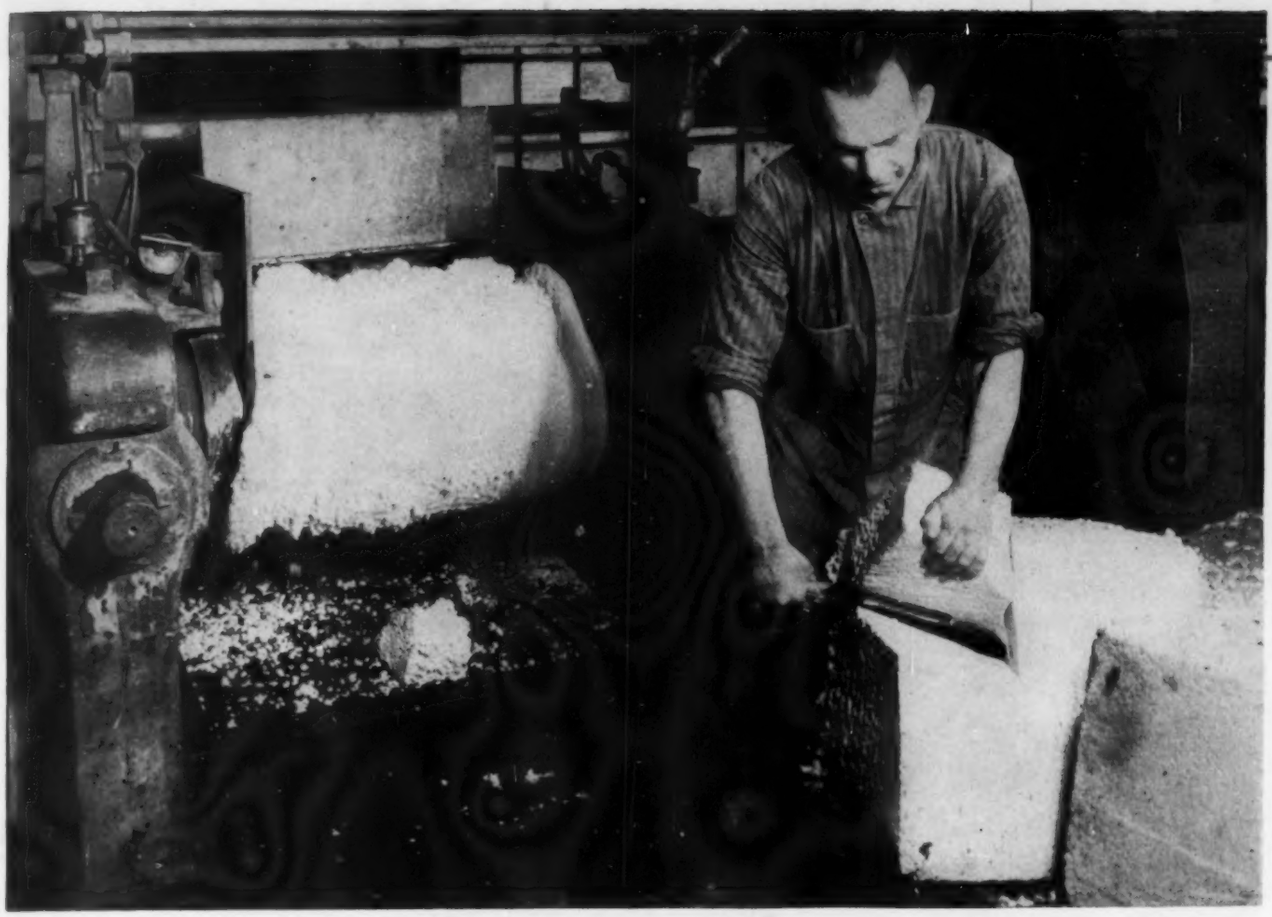
DU PONT
REG. U.S. PAT. OFF.

RUBBER CHEMICALS DIVISION

Wilmington, Delaware

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year. Canada, $3.50; Foreign, $4.00. February, 1942. Vol. 50, No. 5.

FEB 13 1942



A chip off a brand new block

Piece by piece a new block of Hycar is going on this wash mill to be sheeted. Then the sheets will be dried and packed for shipment to . . .

To whom? Just who uses Hycar? What do they produce with it? And why Hycar, particularly?

Progressive, forward-looking rubber processors throughout the country are using Hycar in steadily increasing quantities.

They are using it to make all manner of products for aircraft, for machinery, for the petroleum industry—to name just three of the most intensely active phases of our war production. Further, their engineers and ours are discovering important new uses almost daily.

They selected Hycar—for its extreme resistance to oil, to gasoline, to abrasion and heat; its resistance to aging and deterioration. They selected Hycar for its light weight compared with other synthetic rubbers, for its resisance to cold-flow, its low compression set. They chose it too for its ability to be molded, extruded and otherwise fabricated on the same machinery as natural rubber without re-training personnel.

Like all other resilient materials, Hycar is subject to allocation by WPB, but with productive capacity now doubled, many more requests can be taken care of than formerly. Our engineers are ready to give you every technical assistance.

HYCAR CHEMICAL COMPANY
AKRON • OHIO

HE WOULD HAVE BURNED FOR THIS DISCOVERY!

WITH none but his cat to watch him, the alchemist in the Middle Ages worked at peril of his life, exploring the secrets of nature.

He was the father of modern chemistry. His quest was the "Philosopher's Stone"—a magic substance to change common metals into gold. But had he discovered wonders to compare with the miracles wrought by the modern chemical known as "Cumar"*... he would have been burned at the stake for trafficking with the devil.

For Cumar—a paracoumarone-indene resin developed by Barrett and put to use by progressive chemists and chemical engineers—has given amazing new qualities to hundreds of everyday articles from mastic floor tiling to rubber tires.

On rubber, Cumar confers new life and stretchability. And unlike many compounding agents, it blends equally well with natural or synthetic rubber—a characteristic of special significance today.

* * * *

This modern "Philosopher's Stone" is just one of a long list of coal-tar chemicals that have established Barrett's reputation for uniform, dependable products.

Perhaps you have a product that can be improved, a production schedule that can be shortened, or manufacturing costs that can be pared through the use of a coal-tar chemical. We invite you to drop a line to our experienced Technical Service Bureau, outlining your problem.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK

Barrett Chemicals for the Rubber Industry: Carbonex*... Carbonex*S... Carbonex*S Plastic ... Cumar*... Bardol*... Bardol*B... Bardex*... B.R.H.* No. 2... B.R.T.* No. 7... B.R.V.*... S.R.O.*... Reclaiming Oil No. 1621... B.R.C.* No. 19E... Dispersing Oil No. 10... Resin C* Pitch

Barrett

ONE OF AMERICA'S GREAT BASIC BUSINESSES

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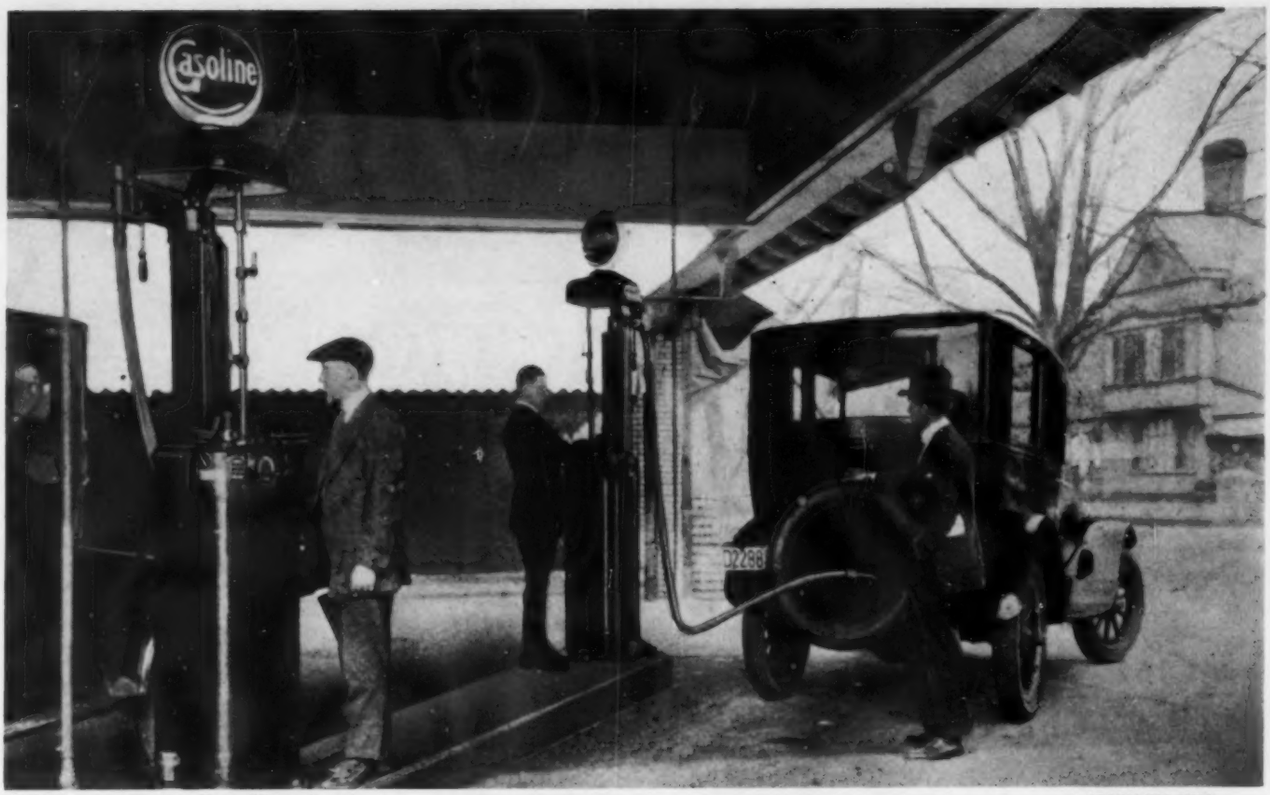

Photo courtesy, Gasoline Pump Mfgrs. Assn.

"BEFORE THE DAYS OF GASTEX"

GASTEX and PELLETEX PROLONG LIFE of Many Types of Hose—

In recent years the service life of many types of hose has been greatly lengthened by the development of special hose materials for specific purposes. Synthetic rubber compounds have been found superior for hose conveying gasoline and solvents.

GASTEX and PELLETEX, the special process blacks, have contributed greatly to the excellency of these compounds, both rubber and synthetic. In promoting resistance to aging, to fatigue with resultant cracking, and to abrasion, GASTEX and PELLETEX, used in tube, friction and cover stocks, have made an important contribution to industrial progress.

Technical information on the behavior of Gastex stocks in all types of hose will be sent when requested on firm's letterhead.

GENERAL ATLAS CARBON DIVISION

OF GENERAL PROPERTIES COMPANY, INC.

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Announcing the Third Edition

First Edition 1919—Second Edition 1930

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Compiled and Edited by the Editorial Staff of The Chemical Engineering Catalog under the supervision of Francis M. Turner, Editorial Director. This THIRD EDITION has been completely revised and enlarged under the supervision of Thomas C. Gregory—Editor.

Up-to-date Information on

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THE CONDENSED CHEMICAL DICTIONARY gives both Scientific and Commercial Information

NEVER BEFORE in the history of the country has the chemical industry been called upon to furnish products in such diversified fields and uses as today. Defense production is pleading for new and cheaper materials as substitutes or supplements for older materials now under priority.

Executives and business men are straining every resource to provide these raw materials necessary to keep their plants in production. Instances occur almost daily of the success or failure of their efforts.

Only the latest, THIRD EDITION, of "The Condensed Chemical Dictionary," thoroughly revised and brought up to date, can provide this information in such easily accessible form. This edition is right up to the minute with the latest information, and contains more than three times the number of items included in the first edition which did such yeoman service for the chemical industry during the first World War.

Absolutely unparalleled in point of usefulness, this work has long supplied the personnel of the chemical and related industries with a short cut to a wealth of specific information about a vast number of commercial substances. . . . It is designed for the practical use of all those who for any reason need to know about the properties, uses, grades, hazards, and peculiarities of any type of chemical product or raw material.

It contains the names of approximately eighteen thousand chemicals and their synonyms, together with their chemical formulas, colors; properties; contants; specific gravities, melting points; boiling points; solubility in water, alcohol, ether and other solvents; their preparation and materials from which they are made, with a brief outline of the process; their grades, uses and the kind of containers in which they are customarily shipped. It also defines the fire hazards and the railroad shipping regulations pertaining to each chemical. New encyclopedic items give information on a variety of raw materials, processing agents, military products, technical commercial terms, and important industrial processes. Another notable feature of the Third Edition is the inclusion of a survey on effects of wartime on chemical prices.

Every executive and rubber technologist can quickly and easily obtain the information to run his plant more efficiently and economically and on a surer basis of production.

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Embattled Freedom commands the utmost from your productive capacity — 24 hours a day. Slow-downs in your mixing room retard the schedule all the way through to the fighting fronts of the world . . . We, too, are working a 24-hour day to help maintain Banburys at their full mixing capacity. Re-building and re-surfacing rotors and mixing chambers has been our specialty for years . . . Such skilled service is ready to do its part quickly, efficiently and dependably to assure TOP SPEED production from every Banbury . . . Don't remain in doubt about the condition of your Banbury . . . Write, Wire or call us for a check-up before a serious wear develops into a breakdown.

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● The accelerated tempo of production resulting from the defense program leaves no time for prolonged tests. It has created an urgent need for rapid and dependable methods of determining the weather resistance or light resistance of protective coatings, rubber, plastics and numerous other products subject to weather deterioration.

This need has stimulated the demand for the "National" Type X-1-A Accelerated Weathering Unit. This unit is recognized by both producer and consumer as one which provides a *true* standard of comparison — rapid in action and unaffected by weather, season or location.

Manufacturers find in the X-1-A Unit a reliable means of evaluating substitute materials, testing new formulas, checking established products and adapting their products to the requirements of the consumers. An increasing number of large consumers are specifying performance in terms of tests made in the "National" Accelerated Weathering Unit.

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Weather Control helps you produce
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What has weather to do with carbon black? Or the quality of rubber production?

Surprisingly, it has a great deal to do with both. For changes in weather—shifts in wind direction or velocity, drops or rises in temperature, rain, sleet, snow—upset the even flow of air in the burner houses in which the black is produced. This in turn affects the uniformity of the black—and consequently of the rubber in which it is used.

Heretofore, weather has been an uncontrollable factor throughout the carbon black industry. But now, thanks to ISOTHERMAL CONTROL, a new and exclusive Continental development*, it has been offset as a variable at Continental. By regulating and maintaining an even balance of draft and temperature within the burner houses, regardless of outside weather conditions, ISOTHERMAL CONTROL assures a better, more uniform black than has ever been possible before in the industry. This greater uniformity is definitely reflected in the quality of the rubber in which it is used. Test after test prove the superiority of the black produced by this method—and now all 366 burner houses at Continental are under ISOTHERMAL CONTROL.

This forward step follows fast on the heels of Continental's new and more practical system of grading, which has proved of great value to black users. Use Continental's ISOTHERMAL CONTROLLED CARBON BLACK to improve the quality of your compounding.

TESTED AND PROVEN! To determine the effectiveness of this control under varying weather conditions, one unit in the Continental Plant was operated for 30 days with the control and 30 days without the control. Frequent samples of the product were taken each day and tested with the D. P. G. adsorption test. The following statistical results indicate the definite superiority of ISOTHERMAL CONTROL:

	With Control	Without Control
Average D. P. G. Adsorption..	48.54	48.35
Maximum + Deviation...	2.83	4.85
Maximum — Deviation...	3.79	7.25
Average Deviation.....	1.04	2.23

* Patent Applied For

CONTINENTAL CARBON COMPANY • 295 MADISON AVENUE • NEW YORK, N. Y.

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A WAR MESSAGE
to
ALL EMPLOYERS
★ From the United States Treasury Department ★

WINNING THIS WAR is going to take the mightiest effort America has ever made—in men, in materials, and in money! Every dollar, every dime that is not urgently needed for the civilian necessities of food, clothing, and shelter, must, if we are to secure final Victory, be put into the war effort.

An important part of the billions required to produce the planes, tanks, ships, and guns our Army and Navy need must come from the sale of Defense Bonds. Only by regular, week by week, pay-day by pay-day investment of the American people can this be done.

This is the American way to win. This is the way to preserve our democratic way of life.

Facing these facts, your Government needs, urgently, your cooperation with your employees in *immediately* enrolling them in a

PAY-ROLL SAVINGS PLAN

The Pay-Roll Savings Plan is simple and efficient. It provides, simply, for regular purchases by your employees of United States Defense Bonds through systematic—yet voluntary—pay-roll allotments. All you do is hold the total funds collected from these pay-roll allotments in a separate account and deliver a Defense Bond to the employee each time his allotments accumulate to an amount sufficient to purchase a Bond.

The Pay-Roll Savings Plan has the approval of the American Federation of Labor, the Congress for Industrial Organization, and the Railroad Brotherhoods. It is now in effect in several thousand companies varying in number of employees from 3 to over 10,000.

In sending the coupon below, you are under no obligation, other than your own interest in the future of your country, to install the Plan after you have given it your consideration. You will receive—1, a booklet describing how the Plan works; 2, samples of free literature furnished to companies installing the Plan; 3, a sample employee Pay-Roll Savings authorization card; and 4, the name of your State Defense Bond administrator who can supply experienced aid in setting up the Plan.

To get full facts, send the coupon below —today! Or write, Treasury Department, Section B, 709 Twelfth St., NW., Washington, D. C.

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1. It provides immediate cash now to produce the finest, deadliest fighting equipment an Army and Navy ever needed to win.
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3. By storing up wages, it will reduce the current demand for consumer goods while they are scarce, thus retarding inflation.
4. It reduces the percentage of Defense financing that must be placed with banks, thus putting our emergency financing on a sounder basis.
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This space is a contribution to NATIONAL DEFENSE by THE RUBBER AGE

Important Last August . . .
Indispensable NOW!

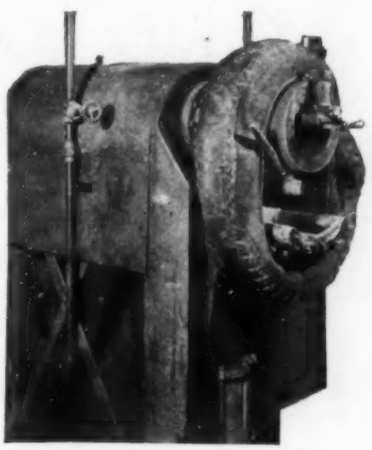
— *The New Black Rock Debeader Cutter and Puller*

Less than 6 months ago we first called these machines to the attention of the rubber industry and told how they could make an important saving of at least 34,000,000 pounds of tire scrap annually.

Today—these machines, and the saving they can make in scrap rubber, are not only important—they are *vital* to the rubber needs of the nation.

Developed by Goodrich engineers for their own use, the Debeader, Cutter and Puller have now been made available to the whole industry as a war measure. In recent weeks hundreds of news stories in newspapers and magazines have described the use of these machines in the reclaiming plant of Goodrich—thus making them known throughout the country as an important adjunct to the rubber conservation program.

"Black Rock Debeader, Licensed by the B. F. Goodrich Company under C. W. Leguillon Patent No. 2,230,302."



DS-2 shows the cutter with tire tensioned and cutting of the beads nearly finished.

DP-4 shows the puller and one hook pulling both beads and the other hook coming down ready for operation on the tire in the foreground.

These machines—made by Black Rock—will effect a saving of approximately 60% of bead section scrap as well as a material saving in time and labor. Proven by many months of successful use in the reclaiming plant of the B. F. Goodrich Co. in Akron.

Write now for details.

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for **INSULATED WIRE**

Tensile strength

Resistance to aging

Dielectric strength

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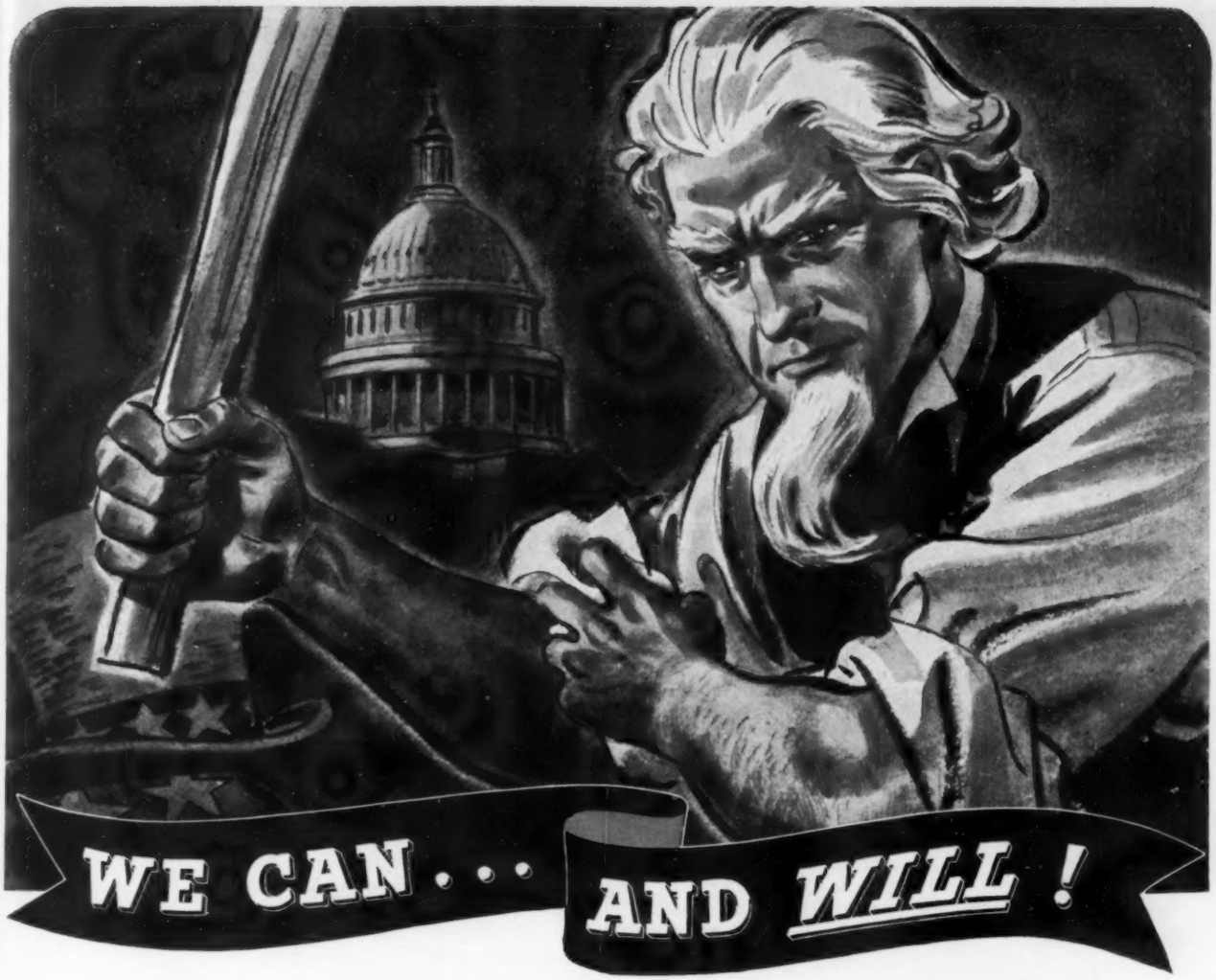


THESE DAYS call for all-out effort—effort that not only does its best, but that *succeeds* in *accomplishing* its purpose.

Your need for solvents is not modified by "maybe" or "perhaps." *You've got to have them!*

We know this because of our years of experience in working closely with your business and many others similar to yours. Thus when you order Skellysolve, *we get it to you.* The present emergency strengthens our determination to do that—and keep on doing that. Phone, write, or wire. We can . . . and *we will.*

SKELLYSOLVE
in the
RUBBER INDUSTRY

There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. It will pay you to investigate Skellysolve. Write today.

SKELLY

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL CO.
SKELLY BLDG., KANSAS CITY, MO.

The Publishers of

RUBBER AGE and the RUBBER RED BOOK

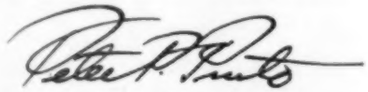
Say, *"Thank You!"*

● This simple appreciation is made in grateful acknowledgment of the loyal support and good-will extended by rubber manufacturers and suppliers to our two publications. These were contributing factors in enabling those publications to record their most successful year in 1941. Not only were substantial gains made in the total number of subscribers but the volume and number of advertisers in each of these two journals were the greatest in our history.

THE RUBBER AGE carried last year a greater number of original technical and practical articles than heretofore; in addition it also expanded its news and statistical pages to meet today's needs. During the year we also received more inquiries and requests for information, data and other assistance from readers and subscribers. Another source of pleasure to us has been the increasing frequency with which RUBBER AGE has been quoted not only in the technical press but in the lay press as well. All of these are the fruit of our studied efforts to constantly improve the editorial and service facilities of this journal which in turn have resulted in a recognition by the rubber industry of its growing importance as one of the world's outstanding rubber journals.

As for the RUBBER RED BOOK we are particularly proud of the reception accorded this book. Already it holds a position rarely achieved by an industrial directory as scores of unsolicited comments from technologists, purchasing agents, suppliers, government workers and others testify. As one user so aptly put it, "Thank God for the RUBBER RED BOOK." What more need be said?

● For 1942, and the years to come, we promise faithfully to continue our policy of alertness and constant progress to the end that both of these publications may still better serve the industry to which they are mutually dedicated.



General Manager

THE RUBBER AGE :: 250 West 57th St., New York :: RUBBER RED BOOK

WAR PRODUCTION OF SYNTHETIC RUBBER *DEMANDS*

PRECISION

-in processes
-in materials

You can depend *absolutely* on the uniform quality of all PICCO Chemicals, including the following, specially prepared for the rubber industry.

Di POLYMER OIL for plasticizing synthetic rubber of the co-polymer butadiene types.

TYPE C RECLAIMING OIL for reclaiming synthetic rubbers.

PICCOUMARON XX SERIES RESINS (para-coumarone-indene) for extending and compounding natural and synthetic rubber.

PICCOUMARON RESINS for hardening, leatherizing or softening mechanical rubber goods.

PICCO RECLAIMING OILS (D-4, E-5, C-10) for reclaiming rubber by autoclave or pan methods.

PICCOLYTE RESINS—similar chemical analysis (carbon-hydrogen ratio) to rubber; for extending, tackifying and cementing.

PENNSYLVANIA
INDUSTRIAL CHEMICAL CORPORATION
CLAIRTON, PENNA.

Representatives in Principal Cities

Makers of: Coumarone Resins • Coal Tar Naphthas • Rubber Plasticizers • Reclaiming Oils

CALCENE

MAKES RUBBER GO FARTHER

Calcene is a re-inforcing Calcium Carbonate pigment of extremely fine particle size. For eight years it has proved its value in making a limited quantity of rubber go farther in terms of finished goods. With today's rationing of rubber, Calcene can be more useful to you than ever.

Among virtually all the materials in its class, Calcene can be loaded at the highest volume with the least deterioration in physical properties. It assures highly loaded stock of low volume cost but with excellent resistance to tear, abrasion and flex cracking.

As supplementary fillers for stiff stocks we suggest the use of clay along with Calcene. For better grade stocks, Silene is recommended.

PITTSBURGH
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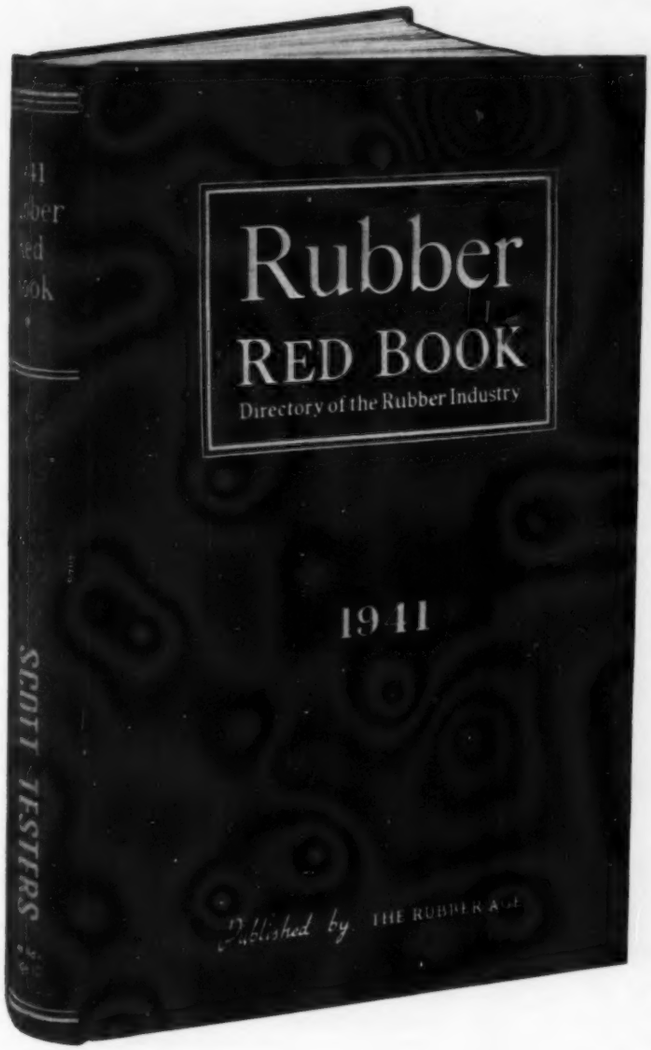

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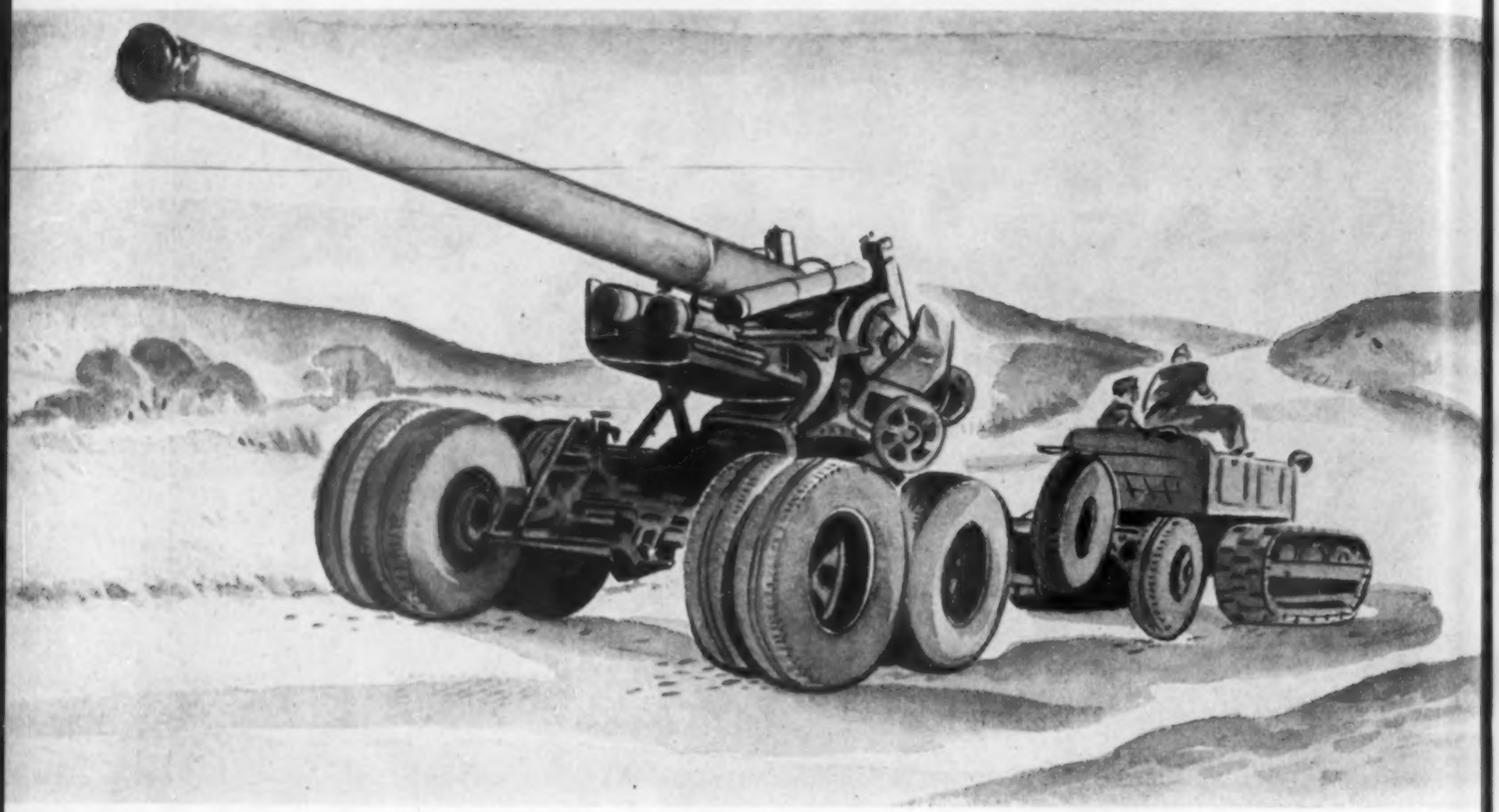

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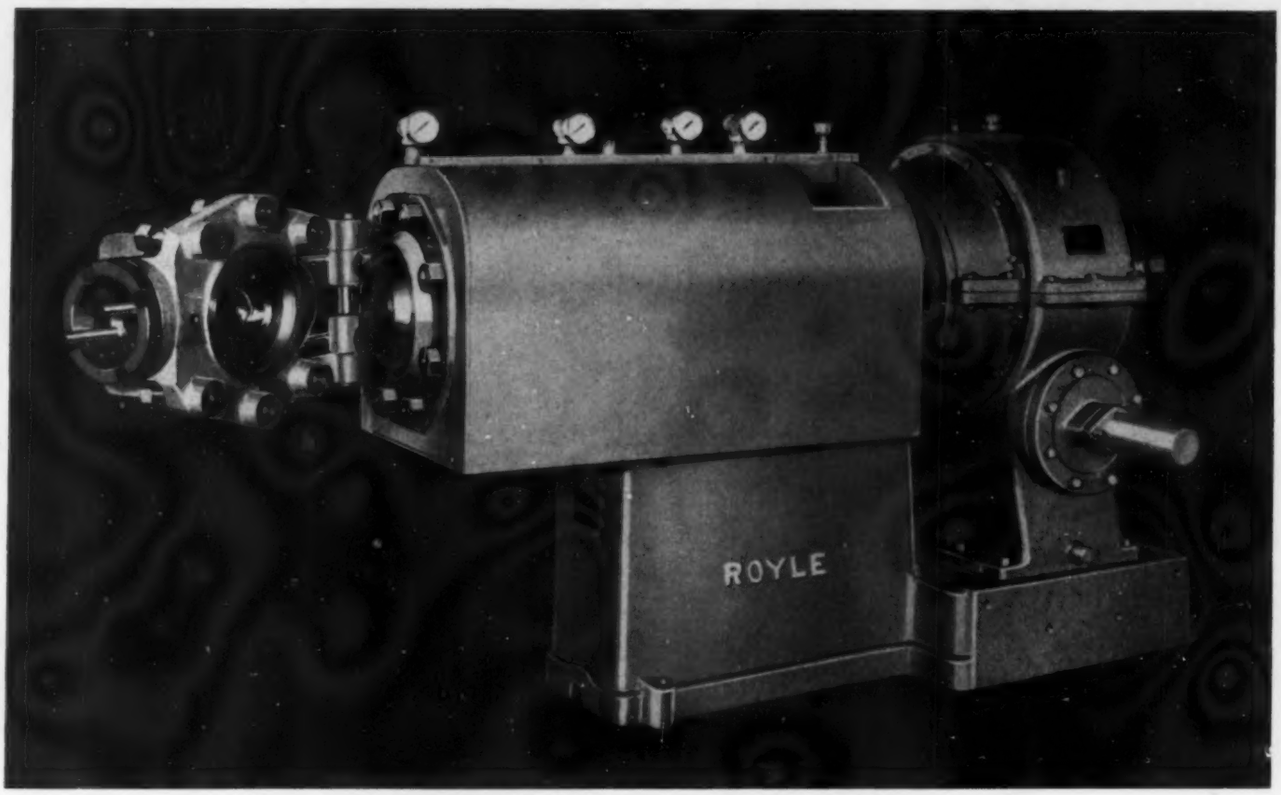

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Published on the 15th of each month by

PALMERTON PUBLISHING COMPANY, INC.

Printing office,
East Stroudsburg, Pa.

Editorial and Advertising Offices,
250 West 57th St., New York City

New England Representative—F. ROYAL CAREY, P.O. Box 133, Providence, R. I.
Western Representative—IRVING V. KOCH, 64 East Lake St., Chicago, Ill.

Entered as Second Class Matter, October 20, 1933 at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879. Subscription Rates: Domestic, $3.00 a year; Canada, $3.50; Foreign, $4.00. Single copies up to 3 months old, 35 cents; over 3 months old, 50 cents. Telephone COlumbus 5-2923, 5-2924. Contents Copyrighted 1942 by the Palmerton Publishing Company, Inc. Indexed in Industrial Arts Index. OFFICERS: P. L. Palmerton, President; E. D. Osborn, Vice-President and Secretary; Peter P. Pinto, Treasurer.

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VOL. 50, No. 5 FEBRUARY, 1942

Tensile Testing of Rubber Compounds at High Temperatures

By RICHARD THORNDIKE

THE purpose of this article is to present briefly the more important findings in connection with tensile testing of rubber compounds at high temperatures, as a consolidation or summary of the subject brought down to date. The material presented is based upon a very extensive series of tests conducted by the East Norwalk, Conn., laboratory of the R. T. Vanderbilt Co., of New York City, during the past fifteen years. The *Vanderbilt News* has provided much data for the conclusions stated, and grateful acknowledgement is hereby made for permission to utilize this material.

Certain of these findings appear to be definitely conclusive. Others are still in the development stage. In any event, we present only the more important; important, that is, in the sense that they are of practical application and apply to a wide range of interests in the industry.

These tests were made on the special Controlled-Temperature Scott Tester. Figure 1 shows the machine, of two-story height, before installation; Figure 2 shows it in place in the laboratory. In essential design it is the standard tensile tester produced by the Henry L. Scott Company, to which has been added a special temperature control tank. This tank has interior dimensions of about 7 inches wide by 6 inches deep by 48 inches, which length is sufficient to allow test pieces to be stretched at the desired temperature to rupture, so that complete stress-strain data and ultimate tensiles can be obtained. The tank is so constructed as to permit easy access for insertion of test specimens and removal of broken pieces. The wire-glass front facilitates observation of the specimen, while on an exterior slide, indicator points show on a scale the positions of the clamps. By circulating steam, water, brine, glycerine, or acetone, temperatures from —70°C. to 100°C. are obtained.

Generally speaking, there are two reasons for the desirability of extreme-temperature testing of rubber compounds. First, the extremes of temperature may be used to simulate the actual temperature conditions to which the rubber may be subjected in use. Second, the extremes of temperature may be used to produce an exaggerated view of the results produced by varying the constituents of a compound, or by varying the cure. For example, a considerable degree of overcure shows up little under a tensile test at room temperature; while a lesser degree of overcure is indicated prominently at 100°C. by shortness and low tensile. When with extremes of temperature, there are combined the effects produced by aging, the conclusions are brought into still clearer focus.

When extreme-temperature testing was first practiced, there was a natural tendency to test vulcanized compounds at many different temperatures and plot the resulting curve. This work led to the following conclusions:

a. Tensile strength is highest at low temperatures and lowest at high temperatures.

b. Modulus is greatest at low temperatures and least at high temperatures.

c. Ultimate elongation is lowest at low temperatures and highest at high temperatures.

Note: All of the charts and figures used in connection with this article are reproduced by courtesy of the "Vanderbilt News."

In the earliest stages of these tests, made by numerous experimenters in various parts of the world, it appears to have been assumed that this type of behavior was characteristic of rubber compounds, although it might vary in degree due to differences in compounding ingredients.

It was not long, however, before it was realized that the opportunity for discovery lay in testing many different compounds and cures at a few widely dispersed temperature points, rather than testing at many temperature points. This was a logical step. Many rubber articles are in service subjected to extreme temperatures. Included among these are tire carcasses, inner tubes, tire curing bags, hospital sheeting, elastic thread, surgeon's gloves, electrician's gloves, hot water bottles, heating pads, wire insulation, cable covers, conveyor belts for hot materials, motor mounts, rubber covered rolls, steam hose, packings, gaskets.

FIG. 1—VIEW OF THE SCOTT CONTROLLED ATMOSPHERE TENSILE TESTER, WHICH IS OF TWO-STORY HEIGHT, BEFORE INSTALLATION.

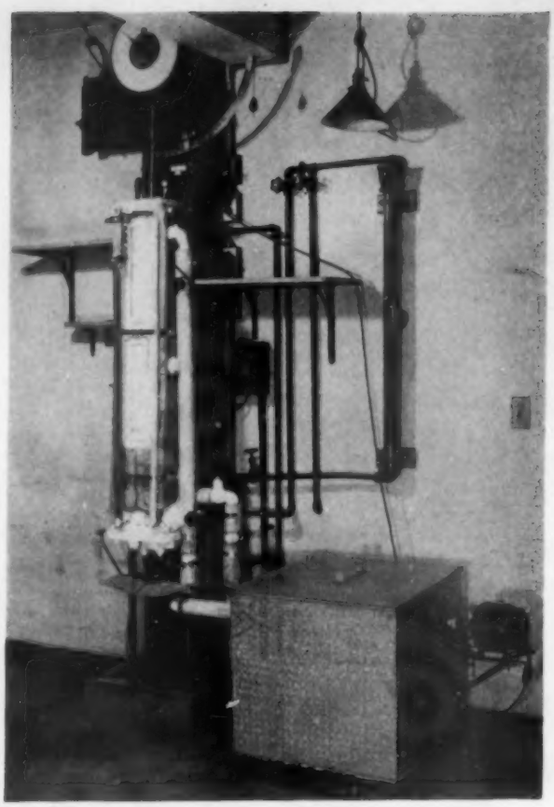


FIG. 2—THE TESTER AS INSTALLED IN THE VANDERBILT LABORATORY. THE TANK IS USED TO PREPARE THE ATMOSPHERE CONTROL LIQUIDS.

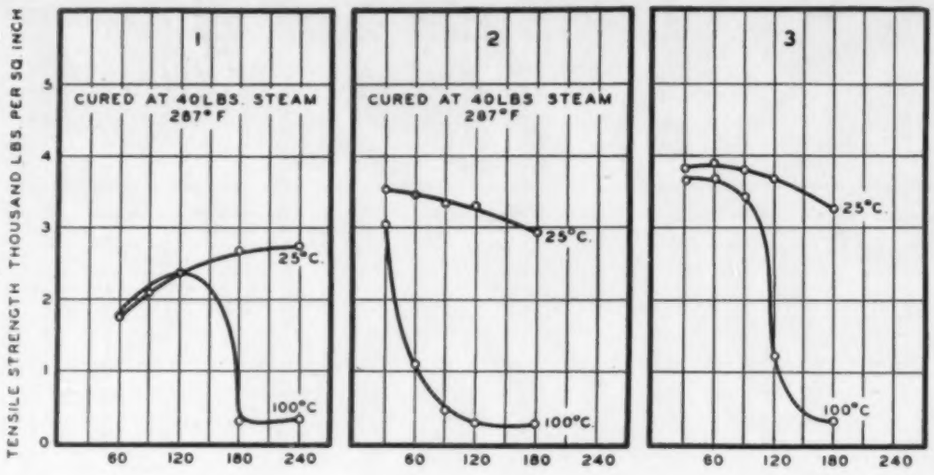
Articles such as these are often subjected to temperatures of 100°C., while tire tubes, especially in bus and truck service, frequently reach and remain at vulcanizing temperatures (at least 125°C.) for considerable periods of time. Therefore, tests at several temperatures, 0, 25 and 100°C., for example, would show the behavior of a vulcanized compound at normal and extreme service temperatures, and would thus be ample to determine the fitness of the compound.

Referring to the conclusions set forth above, it appeared that some features of the characteristic behavior of typical rubber compounds were undesirable in articles designed to withstand high temperatures in use. In the unaged condition, at 100°C., there might be 60% to 90% loss of the tensile strength at 25°C., with often 50% less elongation. Typical examples are shown in Figure 3, Graphs 1, 2 and 3.

When oxygen bomb aging is added to simulate effects of continued service the compound not only deteriorates seriously in tensile properties at 25°C., but at 100°C. has lost most of its serviceable qualities, and even has less elongation. This condition after aging is clearly illustrated in Figure 4. The dotted lines show, after oxygen bomb aging, the same compound shown in Figure 3, Graph 3, before aging.

Endeavoring to find improved compounds that would be equally or nearly as serviceable at high temperatures as at normal temperatures, technicians were faced with the questions: Are the tensile changes which have been shown to progressively accompany

FIG. 3—EFFECT OF HIGH SULFUR RATIOS ON TENSILE PROPERTIES AT 100° C.

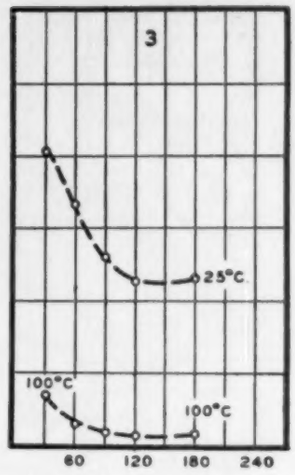


ANALYSIS OF COMPOUNDS IN FIGURE 3

	Compound No. 1	Compound No. 2	Compound No. 3
Pale Crepe	50	50	50
Smoked Sheets	50	50	50
Stearic Acid	1	..	1
AgeRite Powder	..	..	1
Zinc Oxide	10	5	10
D.P.G.	..	1	..
Captax	..	..	1
Sulfur	10	5	4
Total	121	111	117

Press Cures	Tensile Properties—Before Aging Stress at 500%—Tensile Strength—% Elongation at Break					
At 30 Lbs. Steam (274° F.)						
				Tested at 25° C.		
30 Min.				475	3820	800
60 Min.				525	3900	795
90 Min.				550	3800	800
120 Min.				465	3690	815
180 Min.				440	3250	810
At 40 Lbs. Steam (287° F.)						
	Tested at 25° C.					
30 Min.	...	....	...	650	3530	750
60 Min.	275	1725	835	1210	3450	650
90 Min.	360	2075	835	1410	3330	620
120 Min.	385	2360	840	1470	3300	620
180 Min.	585	2680	790	1160	2920	650
At 30 Lbs. Steam						
				Tested at 100° C.		
30 Min.				390	3650	930
60 Min.				455	3680	1000
90 Min.				460	3420	960
120 Min.				415	1230	770
180 Min.				325	325	500
At 40 Lbs. Steam						
	Tested at 100° C.					
30 Min.	...	....	....	390	3030	900
60 Min.	150	1760	1360	650	1080	530
90 Min.	205	2100	1190	...	450	440
120 Min.	245	2380	1125	...	270	320
180 Min.	...	285	400	...	270	320

FIG. 4 — EFFECTS OF OXYGEN BOMB AGING



The above graph shows the same compound as in Figure 3, Graph 3, the broken lines indicating the effect of aging.

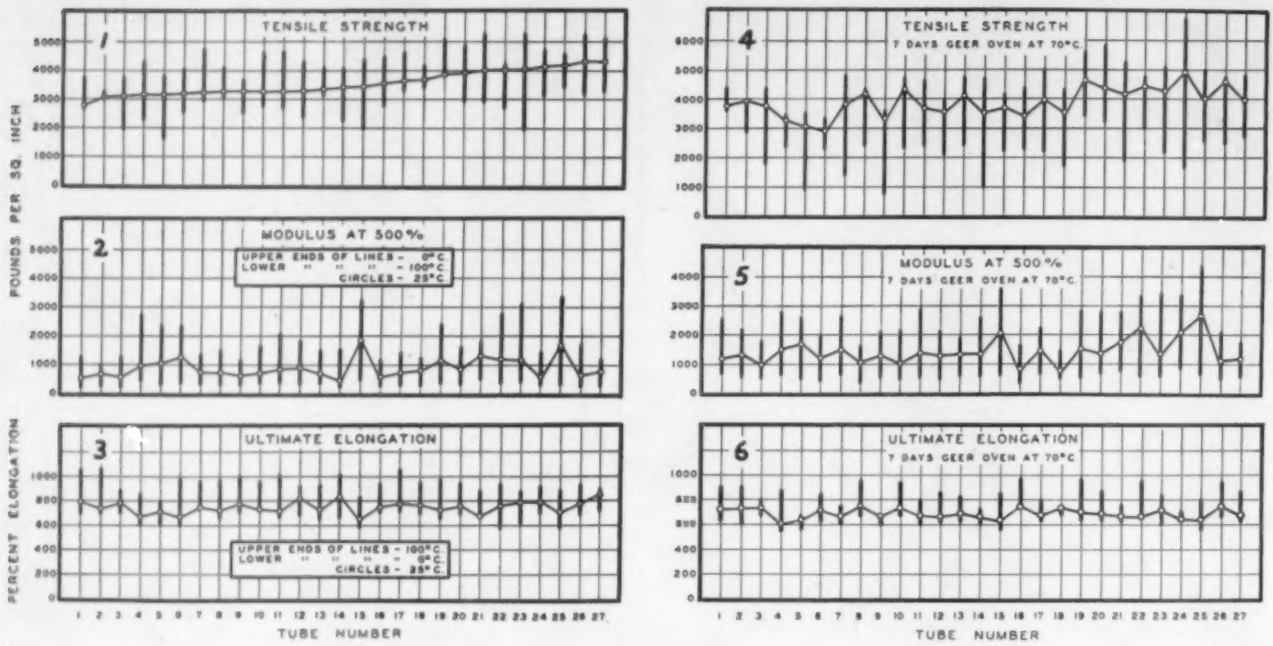
Stress at 500%—Tensile Strength—% Elongation at Break of Compound No. 3, after Aging 4 days in Oxygen Bomb (70° C. and 300 lbs. Oxygen)

Press Cures At 30 Lbs. Steam	Compound No. 3 Tested at 25° C.		
30 Min...	925	4060	725
60 Min...	1015	3320	680
90 Min...	860	2600	675
120 Min...	740	2260	670
180 Min...	625	2300	715
	Tested at 100° C.		
30 Min...	610	700	540
60 Min...	...	295	380
90 Min...	...	185	330
120 Min...	...	130	310
180 Min...	...	165	340

temperature changes, actually essential and inescapable characteristics of rubber compounds? If not, what causes them and how can they be altered to effect improvement?

In 1928 a report was completed on the stress-strain properties of several different types of laboratory compounds. It was shown that wide variations appeared in the stress-strain curves of the same stock at dif-

FIG. 5—TENSILE PROPERTIES OF SMALL AUTO TUBES AT DIFFERENT TEMPERATURES



Tests on 27 tube stocks for tensile strength, modulus at 500% and ultimate elongation are indicated. The top graph shows tensile strength, specimens being arranged in order of their room temperature, indicated by the small white circles. The top end of each line is strength at 0° C., while bottom end is strength at 100° C. The middle graph shows modulus, stock being arranged in the same order, while the lower graph shows ultimate elongation of the same stock arranged in the same order, from left to right. In this case, however, the temperature indication is reversed, the upper end of the line representing 100° C. and the lower end 0° C. At the right are shown the results of testing the same tube stocks after seven days in the Geer oven at 70° C. Stocks are arranged in exactly the same order in these three aged charts as in the unaged charts at the left.

ferent temperatures, with a progressive drop in the stress values as the temperature was raised from 0°C. to 100°C.; that compounds with different amounts of sulfur had different stress-strain relationships; that different rubbers caused some variation; that the state of cure caused a wide variation; and that overcures were indicated prominently at 100°C. by shortness and low tensile, whereas at room temperature this shortness might remain concealed.

Further indication that compounding and curing could be varied to effect improvements, was obtained in a detailed series of tests on 64 different automobile inner tube stocks. These were tested in three groups: small, medium, and bus and truck. In the first group were 27 tube stocks. These were tested at 0, 25, 70 and 100°C. for modulus, tensile and elongation, both unaged and after Geer oven aging 7 days at 70°C. Figure 5 shows the results of tests on this small tube group, unaged and Geer oven aged. The specimens are arranged from left to right in order of their unaged tensile strength.

It is evident that there are large variations in tensile between 0°C. and 100°C., the greatest loss being about 63% (tube 23) and the smallest about 9% (tube 2); also that high tensile at room temperature does not necessarily mean high tensile at 100°C., at which temperature small car tires and tubes often operate for long periods. It is therefore not possible to judge from the tensile at 25°C. how a tube will behave at higher temperatures. But it is clear in general that a tire or tube becomes stronger in cold weather and weakens in hot weather. The effects of temperature on modulus and ultimate elongation of the tubes are also shown graphically in the same way as tensile strength.

Comparing the foregoing graphs with those for Geer oven aged specimens arranged in the same order, we see—judging by 25°C. results—that the effect of aging was apparently to raise the general average of all tubes by 300 lbs. tensile strength. But the general average at 0°C. was raised only 170 lbs. while at 100°C. it went down about 550 lbs., representing an average loss of 20% for each tube. It is evident that testing at room temperature does not reveal the true effect of Geer oven aging on the rubber. The slight enhancement at room temperature is usually taken to indicate a mild vulcanizing action caused by the prolonged heating. That the rubber actually is being overcured is shown only by the 70°C. and 100°C. tests.

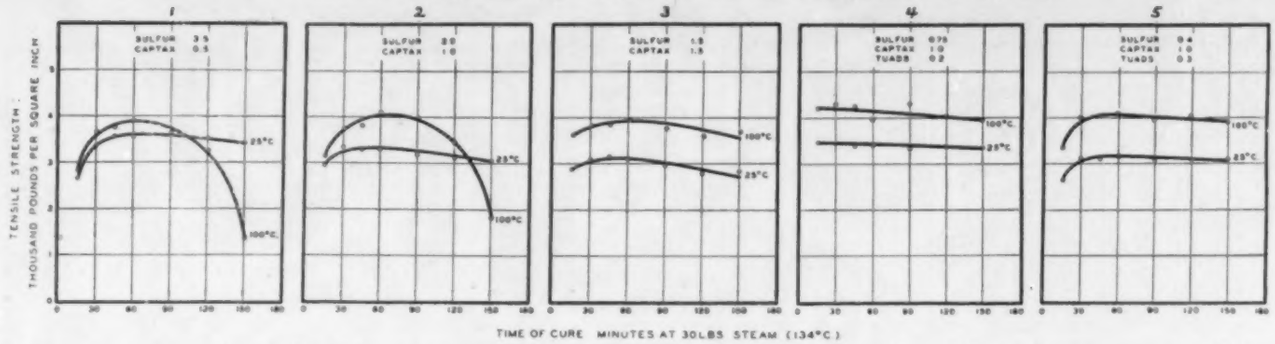
A very brief summary of the results of the entire series of tube tests would be as follows:

	Average at 25° C. lbs./sq. in.	Average at 100° C. lbs./sq. in.	% Loss
Unaged	3585	2800	22
Air Bomb, 3 Hours	1850	915	51
Oxygen Bomb, 4 Days	3370	1830	46
Geer Oven, 7 Days	3745	2095	44

To sum it up another way, let us take the loss in tensile from unaged at 25°C. to 100°C. as follows:

From Unaged at 25° C. (3585 lbs.) to—	Lbs. Loss	% Loss
Unaged at 100° C. (2800 lbs.)	785	22
Air Bomb at 100° C. (915 lbs.)	2670	74
Oxygen Bomb at 100° C. (1830 lbs.)	1755	49
Geer Oven at 100°C. (2095 lbs.)	1490	40

FIG. 6—EFFECT OF DECREASING SULFUR ON TENSILE PROPERTIES AT 100° C.



Above are shown graphs for five different compounds arranged from left to right in the order of decreasing amounts of sulfur. Materials in all five compounds, with the exception of the sulfur and accelerator, were as follows: Pale Crepe, 50; Smoked Sheets, 50; Stearic Acid, 1; AgeRite Powder, 1; Zinc Oxide, 10. Sulfur varies as indicated on each chart, with balancing variations in the accelerator.

Press Cures At 30 Lbs. Steam (134° C.)	Physical Properties—Before Aging: Stress at 500%—Tensile Strength—% Elongation at Break														
	Compound No. 1			Compound No. 2			Compound No. 3			Compound No. 4			Compound No. 5		
	Tested at 25° C.														
15 Min.	295	2650	850	385	2950	810	325	2880	820	460	3470	810	290	2650	875
45 Min.	560	3560	800	475	3300	795	370	3160	815	530	3390	775	430	3100	800
90 Min.	650	3580	780	470	3190	790	360	2960	825	495	3330	765	475	3060	770
150 Min.	535	3400	800	420	3050	805	325	2840	835	520	3340	750	470	3100	775
	Tested at 100° C.														
15 Min.	95	2850	1240	145	3170	1190	140	3640	1110	170	4210	1095	50	3350	1250
45 Min.	240	3760	1090	240	3810	1060	160	3880	1130	230	4270	1040	130	4065	1090
90 Min.	300	3670	1000	235	4000	1100	170	3790	1155	210	4310	1030	145	3970	1065
150 Min.	270	1350	820	180	1830	975	140	3720	1190	210	3970	1015	140	3920	1065

This method of testing brings to light weaknesses in the rubber that are not revealed by tests made at ordinary temperatures. It is particularly important for artificially aged samples, which frequently appear to have withstood the aging satisfactorily, whereas the 100°C. test shows they have been damaged.

The results obtained from these series of tests on tube stocks clearly indicated that some methods of compounding and curing were far superior to others in producing vulcanized stocks that were capable of withstanding high temperatures and aging treatment, still retaining superior service properties. As these samples were taken from regular commercial tubes, the formulas of the stocks were unknown to the laboratory, and thus it was impossible to correlate the results obtained with their composition. Therefore, it was necessary to formulate various compounds for testing.

Observation had made it clear that a major element in the problem of producing heat resisting compounds, was the curing—both as regards the vulcanizing materials employed and the method of cure. Especially had it become evident that varying sulfur ratios definitely affected tensile properties. Of the many hundreds of tests made to determine the effects of varying vulcanizing materials and methods, we reproduce a few selected graphs and figures here as being especially significant.

In Figure 3, Graphs 1, 2 and 3, we have already shown how overcuring can take place without becoming apparent from tests at 25°C., although it is clearly revealed by tests at 100°C. These are high-sulfur compounds, and are characterized by a marked loss of tensile properties at higher temperatures.

Broadly speaking, the presence of sulfur tends to affect adversely the tensile properties of rubber compounds, particularly at high temperatures. Figure 6 shows a group of five compounds with the following percentages of sulfur, reading from left to right respectively: 3.5%, 2%, 1.5%, 0.75%, 0.4%.

As indicated, the lines show the tensile strength for two temperatures, normal and 100°C. In addition we give stress at 500% and % elongation at break for various curing periods. Figure 6, it should be borne in mind, shows cured, but unaged, stock. While it illustrates partially the stability obtained by keeping sulfur to the minimum, it does not represent conditions of use under which heat resistant compounds must give service.

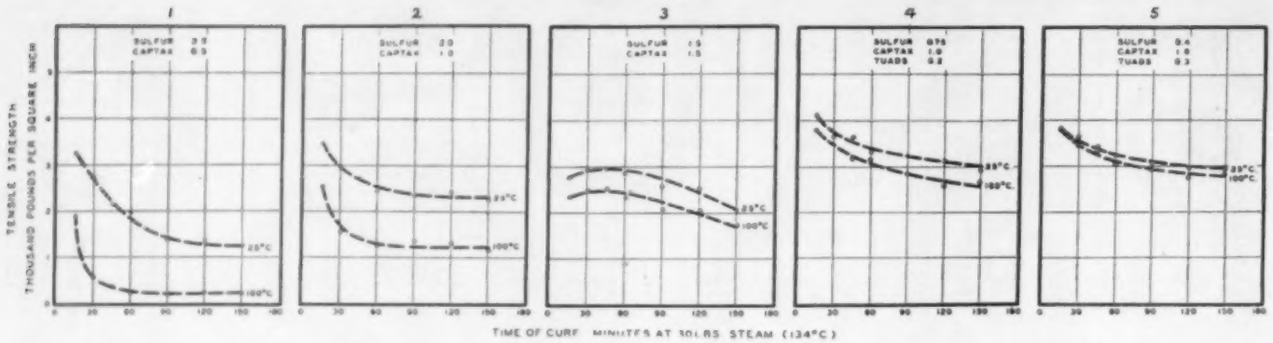
Figure 7 shows the same compounds tested after air bomb aging (3 hrs. 127°C., 80 lbs. air). Figure 8 shows the same five compounds after aging 4 days in oxygen bomb (70°C., 300 lbs. oxygen). In addition, without plotting the results, we give Geer oven test figures for the same five compounds.

Study of these data indicate why tests at 100°C. are necessary, in conjunction with aging, in order to thoroughly prove the heat resistant qualities of a given compound.

Referring to the specimens plotted, it will be observed that all of the unaged compounds show good tensile values at 100°C. Nevertheless, the curves of those with the higher amounts of sulfur show a distinct downward trend in the longer curves. This trend is entirely lacking in the curves of the compounds with the lower sulfur ratios.

The 100°C. curves of the specimens aged in the air

FIG. 7—EFFECT OF AGING IN AIR BOMB AT 127° C. AND 80 LBS. OF AIR



The above graphs show the same compounds as in Figure 6 after air bomb aging.

	Compound No. 1			Compound No. 2			Compound No. 3			Compound No. 4			Compound No. 5		
						Tested at 25° C.									
15 Min.	690	3250	750	610	3490	785	540	2770	745	830	4130	720	615	3810	775
45 Min.	610	2150	725	445	2720	775	360	2960	850	480	3640	805	365	3430	870
90 Min.	700	1375	610	415	2340	785	290	2570	860	445	3330	790	330	3090	870
150 Min.	600	1250	620	375	2250	815	285	2060	820	455	2900	800	290	2930	850
						Tested at 100° C.									
15 Min.	345	1895	830	260	2570	950	335	2350	990	405	3800	950	315	3870	955
45 Min.	235	375	615	250	1420	850	255	2550	1035	310	3175	1010	265	3360	1050
90 Min.	...	200	345	230	1360	820	215	2100	1045	270	2835	1000	235	2950	1060
150 Min.	...	225	420	205	1170	800	170	1750	1080	270	2660	1035	200	2910	1100

and oxygen bombs present a significant picture. At the higher sulfur ratios, these curves drop sharply in the early cures, diverging widely from the "unaged" curves. As the sulfur ratio diminishes, the "aged" curves gradually rise and approach the "unaged" curves. When the sulfur ratio goes below 0.75%, the "aged" and "unaged" curves lie together within a small area of the graph, sometimes almost coinciding.

The data presented above relate to a series of pure gum compounds. By reducing the sulfur ratio used for vulcanization, together with suitable increases in the acceleration, there results increased stability, enhancing resistance to heat and aging. Not only do these low sulfur compounds yield high tensiles at 25°C. and 100°C., but they also have numerous other commercial advantages, which are outside the scope of this article.

Curing Time

In studying the most advantageous curing period, high temperature testing is of valuable assistance. Reference to Figure 3 serves as an illustration. Observe that the 25°C. curve of each compound appears to indicate a satisfactory tensile, but that the 100°C. curve clearly depicts overcure, and reveals inability to stand up under conditions of high heat service.

The value of aging in connection with high temperature testing is well illustrated by Figure 9. The solid lines indicate the unaged compound, while the broken lines indicate the aged specimens. The aged stock, tested at 25°C., should rightly be considered excellent. Nevertheless, the 100°C. tests made on the aged stock reveal a definite injury that is scarcely noticeable in the 25°C. tests, and even indicate approximately at what curing time the rubber begins to overcure seriously.

Effect of Loading Materials

One of the subjects upon which Vanderbilt laboratory has done a very considerable amount of testing is the effect of various fillers on tensile properties. Since they had already established the fact that sulfur content was of great importance, they arranged this series of tests to incorporate each type of filler in both a low-sulfur and a normal sulfur compound. Tests were also made before and after aging. Thus, the test of each type of filler fell into four divisions, low-sulfur both unaged and aged, and normal sulfur both unaged and aged.

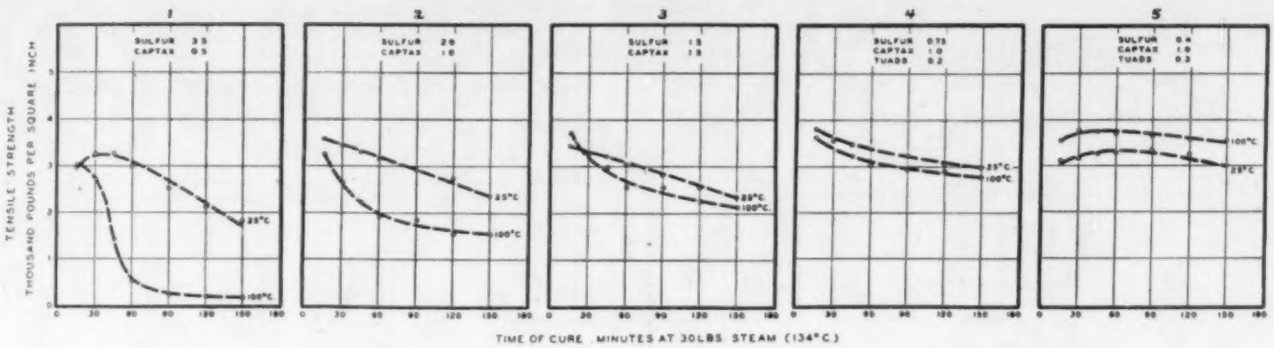
Figure 10 (on page 352), showing a group of representative fillers, tells its own story. Generally speaking, the difference in tensile properties previously observed as caused by varying amounts of sulfur was evident in each of these compounds regardless of the filler used. The combination of 100°C. temperature and oxygen bomb aging showed with customary effectiveness the true ability of each compound to perform under conditions of extreme temperatures and to resist aging.

Summary

Referring to the general conclusions originally considered correct regarding the change of tensile properties accompanying change of temperatures, let us review them in the light of recent findings.

In (a) it was stated that "tensile strength is highest at low temperatures and lowest at high temperatures." Referring to test graphs in Figures 6, 7 and 8, it becomes evident that we must modify this statement. It would be correct to say that the tendency is to react as stated above, but that it is possible, by proper selection of materials and vulcanizing methods, to produce

FIG. 8—EFFECT OF OXYGEN BOMB AGING



The above graphs show the same compounds as in Figures 6 and 7 after four days in the oxygen bomb at 70° C. and 300 lbs. oxygen.

	Compound No. 1			Compound No. 2			Compound No. 3			Compound No. 4			Compound No. 5		
Tested at 25° C.															
15 Min.	465	2960	805	670	3590	755	600	3430	760	625	3810	740	520	3110	775
45 Min.	795	3270	710	710	3360	725	470	3220	780	620	3490	750	550	3260	760
90 Min.	820	2510	690	590	2930	730	450	2830	785	545	3240	740	550	3345	770
150 Min.	760	1820	755	540	2370	770	380	2350	800	535	3000	750	510	3000	780
Tested at 100° C.															
15 Min.	360	3030	990	375	3250	950	405	3710	1000	435	3650	950	245	3560	1120
45 Min.	455	1420	785	430	2230	840	310	2980	1000	385	3240	980	280	3770	1100
90 Min.	...	240	425	330	1860	940	250	2550	1010	350	2950	730	295	3650	1030
150 Min.	...	180	310	275	1550	885	210	2130	1050	330	2800	910	260	3575	1100

compounds which actually reverse this rule and show higher tensile strength at 100°C. than at 25°C.

In (b) it was stated that "modulus is greatest at low temperatures and least at high temperatures." This statement is in harmony with the latest findings.

In (c) it was stated that "ultimate elongation is lowest at low temperatures and highest at high temperatures." Findings to date continue to bear out this statement.

Other findings:

Testing at 100°C. (or nearly so) is essential to determining conclusively the service properties of compounds designed to withstand high temperatures.

The effect of sulfur in large percentages is to injure tensile strength at high temperatures.

Aging tests, combined with 100°C. tensile tests, are necessary in order to conclusively determine the service properties of compounds designed to withstand high temperatures.

The amount of cure has a major effect in producing tensile properties that will withstand high temperatures.

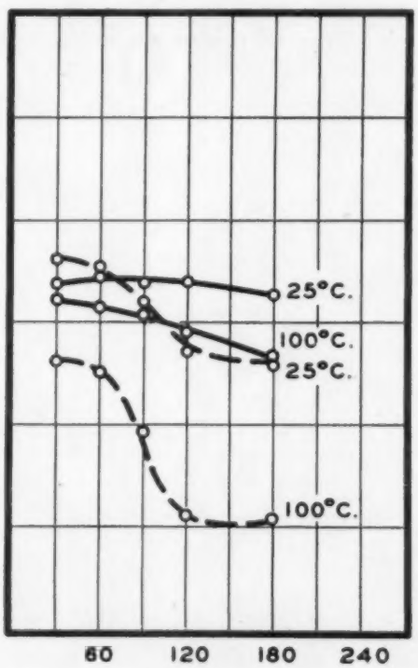
Gradual reduction of the sulfur ratio used for vulcanization, together with suitable increases in acceleration, produces an increasing stability in pure gum compounds enhancing their resistance to heat and aging.

The greatest resistance to heat and aging is reached with sulfur ratios of 0.75% of sulfur on the rubber

Low sulfur stocks reach the optimum of cure faster than normal-sulfur stocks, and can be heated considerably beyond the optimum without damage.

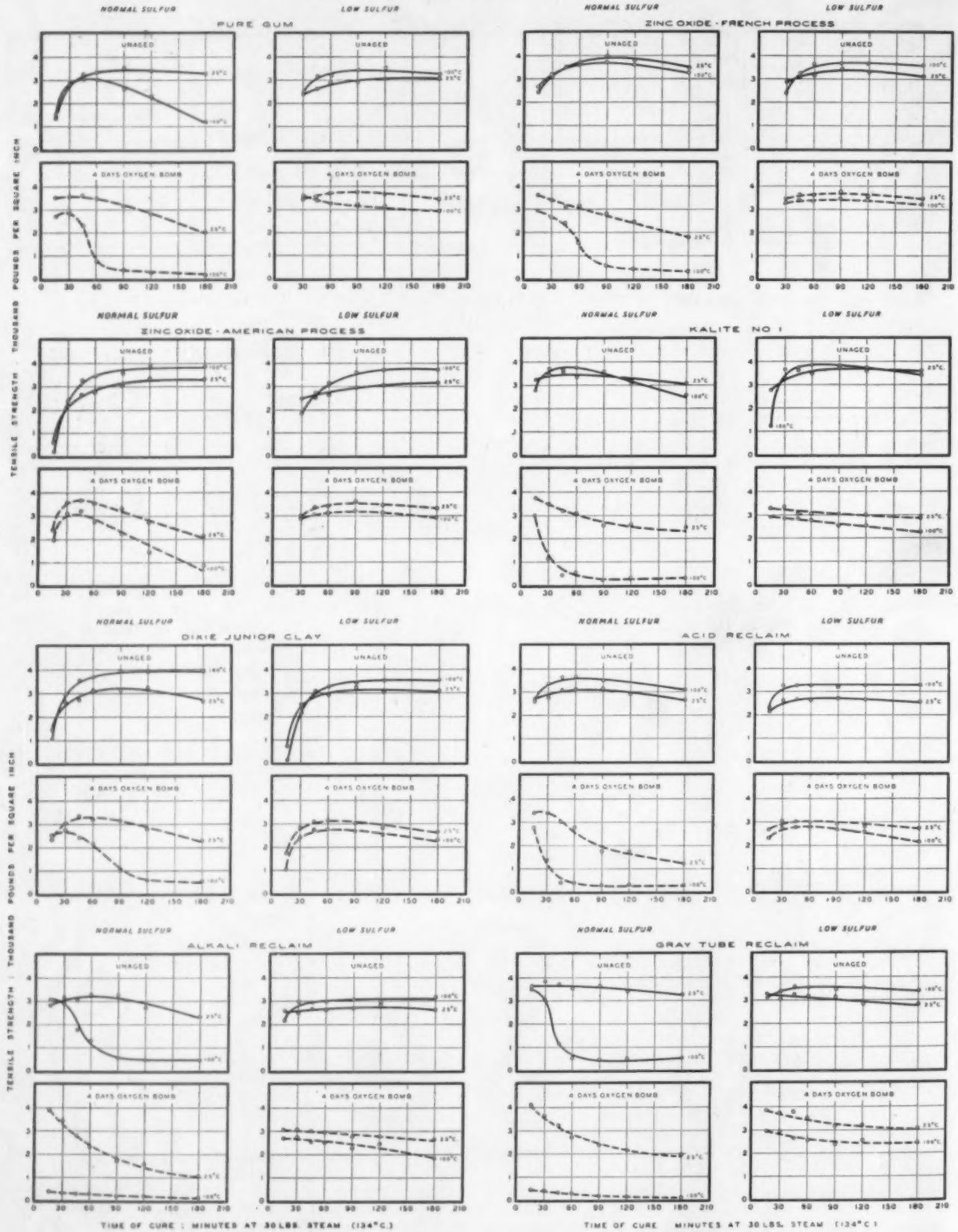
In low-sulfur stocks, the tensile properties vary somewhat according to filler used, but the tensile strength at 100°C. is, in all cases tested, close to that at 25°C., being highest in unaged stock and lower in aged stock.

FIG. 9—EFFECT OF OXYGEN BOMB AGING ON PURE GUM COMPOUND CONTAINING 2.5% OF SULFUR ON THE RUBBER



Unbroken lines, before aging, fail to indicate the true service properties of the compound as brought out by the broken lines which show tensile properties after oxygen bomb aging.

FIG. 10—LOW SULFUR VERSUS NORMAL SULFUR COMPOUNDS WITH VARIOUS FILLERS



The above graphs lead to the conclusion that the type of filler or loading material has relatively little effect on tensile properties. and agrees with observations that the relative sulfur content has a large bearing on tensile properties regardless of filler used.

Finishing Hard Rubber Products With the Wetordry 3-M Method

By GLENN E. WINTON

Coated Abrasives Division, Minnesota Mining & Mfg. Co., St. Paul, Minnesota.

THE need for a flexible coated abrasive that could be used with water first appeared about twenty-five years ago and as a result of research on this problem begun sometime in 1916 "Wetordry" sanding paper was first made commercially available by the Minnesota Mining & Manufacturing Co. in June, 1921. In 1933 research efforts were directed toward the development of a waterproof abrasive cloth that would have greater tensile strength than waterproof abrasive paper so that mechanical sanding with water would be practical. The physical characteristics of paper in regard to tensile strength and lack of conformability limited the use of paper primarily to hand sanding. As a result of this latter research, "Wetordry" Cloth was introduced in June, 1936.

Wetordry Cloth, so called because it can be used either with water or alone in the dry state, is now being used for finishing operations in the hard rubber, plastics, glass and other industries. It is a little known fact, but a typical example of the many varied uses for synthetic resins, that the waterproofing of cloth and the bond for holding abrasive grain on the treated cotton cloth backing utilizes a synthetic resin—both silicon carbide (Tri-M-ite) and aluminum oxide (Three-M-ite) minerals are used for abrasive coating on Wetordry Cloth. The finished product is 100% impervious to water. When used dry, the abrasive bond is not affected by frictional heat developed in dry sanding.

FIG. 1—The operator is using a Wetordry Tri-M-ite cloth belt with water on a hand stroke table sander to finished a molded hard rubber refrigerator door. This type belt produces a satin-like finish.

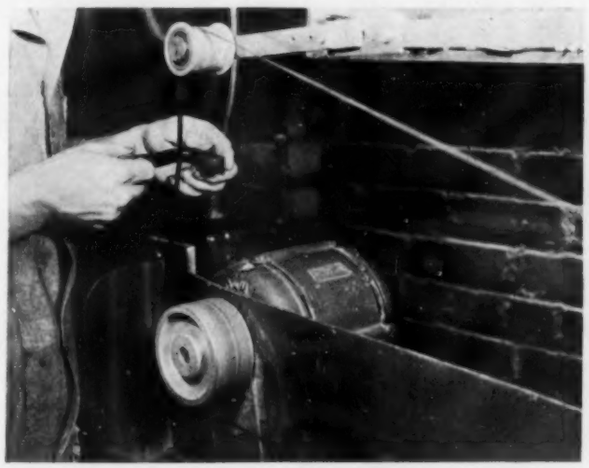


FIG. 2—Profile sanding with a one-half inch wide belt to remove flash and mold parting line.

Before the development of Wetordry Tri-M-ite Cloth practically all finishing or sanding operations on molded hard rubber products were necessarily accomplished with abrasive cloth and paper that could only be used dry. In dry sanding molded hard rubber articles such as refrigerator doors, frames, ice cream cabinet covers, toilet seats, handles, casters, etc., there are many objectionable features that can be eliminated through the use of water as a sanding lubricant and coolant with Wetordry Tri-M-ite Cloth belts, discs, sleeves, or cones. Some of the objectionable features of dry sanding that can be eliminated by wet sanding are:

1. Excessive dust;
2. Burning or discoloration due to frictional heat developed in dry sanding;
3. Warping or distortion of articles due to frictional heat;
4. "Filling" or "loading" of the abrasive belt or disc is eliminated through the use of water as a sanding lubricant and coolant.

Another important consideration to all fabricators

of molded hard rubber articles is the amount of buffing time required to remove sanding lines before color buffing, as well as the number of handling operations, which should be held to a minimum. For example, if a given article is dry sanded with grit No. 120 belts, the same operation can be accomplished with No. 280 Wetordry Tri-M-ite Cloth belts used with water and the sanding lines can be removed with one buffing operation, whereas it might take two buffing operations and considerably more time to remove the No. 120 sanding lines. In going to the finer grade in waterproof cloth there is no appreciable loss in sanding time or belt yield because the abrasive surface is kept clean and cool through the use of water sprayed on the belt, ahead of and just following the area where sanding is accomplished.

Wetordry Tri-M-ite Cloth belts can be used on almost any type of belt sander that is properly equipped for wet sanding. All types of flat stock can be sanded on the ordinary table type hand block or hand stroke belt sander or a horizontal or vertical bed sander (with metal platen supporting belt.) The hand stroke type sander is illustrated in Figure 1 in connection with the finishing of a molded hard rubber refrigerator door.

For sanding inside radii or profile sanding of irregular shapes, a narrow unsupported belt can be used very successfully. Belt speeds for wet sanding should be held between 2,500 and 3,000 s.f.p.m. Higher speeds will reduce the belt cutting efficiency by limiting the amount of water that can be carried on the abrasive belt. Figures 2 and 3 show methods of sanding irregular shaped articles, both profile sanding and finishing inside curves and radii.

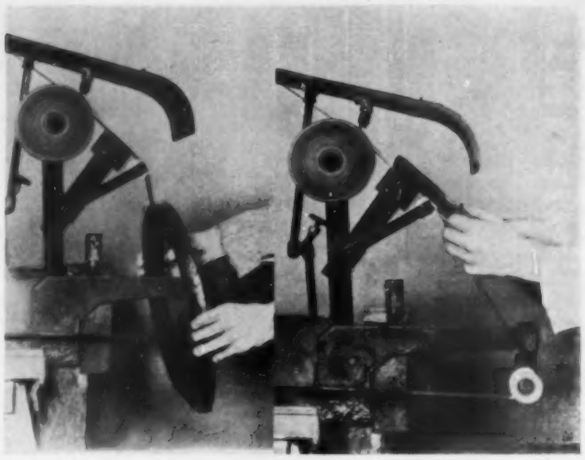


FIG. 3—Sanding flat area and inside curves of molded hard rubber toilet seats.

Hewitt Rubber installs Metal-Enclosed Power Equipment

A RECENT plant-wide expansion program at the plant of the Hewitt Rubber Corporation of Buffalo involved the erection of several new buildings and the installation of new equipment. Large synchronous motors were required on several new machines and a preliminary survey indicated that additional transformer capacity would be necessary.

The existing power transformers consisted of twelve 100-kva units operating in parallel as four three-phase banks. The lighting transformer capacity consisted of six 25-kva units, each operating single-phase at 110 volts. To add more transformer units seemed out of the question without enlarging the station.

Metal-clad switchgear installed in Hewitt plant.

A thorough study of both primary and secondary switching equipment and an analysis of the interrupting capacity of primary breakers led to a decision to completely modernize the station with new General Electric power and lighting transformers and modern switchgear equipment. Metal-clad switchgear was selected for the primary requirements and metal-enclosed air circuit breaker switchgear for the secondary.

The compact arrangement of the modern switchgear permitted the transformers to be located in one end of the substation and the switchgear in the other, as well as the use of a fire wall through the middle of the room for further safety to the operators. The primary equipment is for 2200-volt, three-phase, 25-cycle service. It consists of two incoming line units and three outgoing feeder units with a compartment and facilities for the power company's metering equipment.

The new metal-enclosed equipment and the bus trough connecting the secondary switchgear with the transformers is finished in light metallic bronze color. The interior of the switch room has been finished in a color which harmonizes with the switchgear and presents a very pleasing appearance.

With the stepping-up of production in this plant and the increased importance of continuity of service, the installation of this modern equipment is very timely.

Use of X-Rays in the Rubber Industry

A Brief Review

By R. T. FOREMAN

Kelley-Koett Mfg. Co., Inc., Covington, Kentucky

SUDDEN disappearance of our normal supply sources of raw rubber has compelled industry to turn to synthetic rubber. Properties of the synthetic material are now well known, and X-ray analysis has played a considerable part in its development.

One of the most useful applications of X-ray analysis is that known as diffraction analysis, which makes it possible to peer into the very composition of matter and visualize the arrangement of molecules. When a sample of rubber is placed in the path of a narrow pencil of X-rays, reflection occurs from each molecule, and the film records an image whose shape depends on the molecular arrangement of the material.

Equipment required for this type of examination is very simple, a typical arrangement being shown in Figure 1. This equipment is completely shockproof and gives excellent results in the hands of the average laboratory employee. It consists essentially of an X-ray tube mounted vertically on the axis of the cylindrical housing. A specimen is placed in the path of a pencil beam of X-rays and casts a shadow on the film, which is supported vertically in special holders mounted on the unit. These shadows may be readily interpreted on the basis of available data.

It is found, for example, that when rubber is stretched, sharp fiber patterns appear. From these patterns it is possible to differentiate between gel and sol phases, which also may be crystallized.* This distinctive property — development of fiber patterns on stretching — was not duplicated in any synthetic rubber until chloroprene was developed.

* G. L. Clark, "Progress in X-ray Research on Rubber," RUBBER AGE (*N. Y.*), Vol. 38, p. 79 (1935).

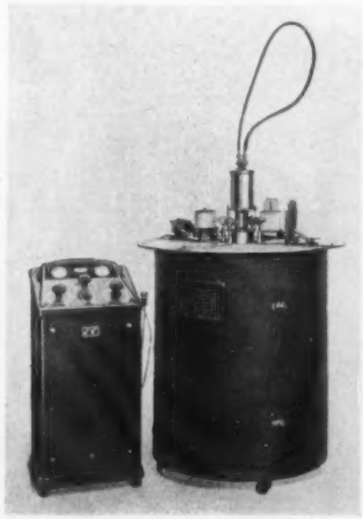


FIG. 1 — Typical arrangement of equipment used in diffraction analysis.

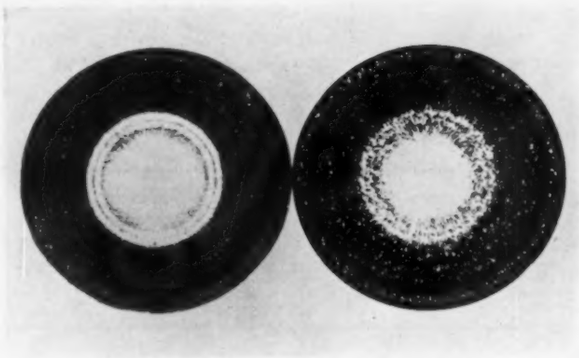


FIG. 2—Position, uniformity and homogeneity of the core of a golf ball can be determined readily through the use of X-ray equipment, as depicted by the above reproduction.

Many additional characteristics of rubber have been studied by diffraction analysis. Vulcanization, oxidation, processing, and fillers may be analyzed to determine the changes occurring. The diffraction pattern shifts as the molecular structure changes, permitting the observer to follow those changes from beginning to end.

In addition to the diffraction apparatus illustrated, the rubber industry has found wide use for conventional X-ray equipment, both radiographic and fluoroscopic. In radiography, the object under study records a shadow on special film which produces a permanent record. In fluoroscopy, the X-ray beam is used to produce fluorescence on a special screen, coated with an emulsion which emits visible light when excited by X-rays. The object is frequently moved past the fluoroscopic screen on a belt, permitting rapid examination to determine the presence of foreign bodies, irregular contour, etc. Reclaimed rubber, for example, may be rapidly tested to determine the presence of metallic particles which might damage molding equipment. Rubber tires are checked for accurate centering and firm bonding of cable in the bead of the tire.

X-ray study of finished golf balls has produced great improvement in quality. Figure 2 shows the type of information obtained, accurately portraying the position, uniformity, and homogeneity of the core. It has recently been possible to carry such studies even further, actually recording the compression of the golf ball at the moment of impact.

Fluoroscopic examination is widely utilized in the cable industry, particularly in rubber-covered cables intended for use on high voltages. Figure 3 illustrates a cable designed for operation on 50,000 volts; the central conducting core is surrounded by an insulating material, covered on the outside by a flexible metallic sheath. The cable is very flexible, and with such a high voltage applied to insulating medium, the core and sheath must be truly concentric over the full length of the cable.

The great advantage of X-ray testing lies in its non-destructive nature. A golf ball might be cut open for examination; a rubber tire might be cross-sectioned; a cable might be subjected to voltage above normal to produce breakdown. Such tests, however, are completely destructive, and although they may supplement X-ray examination, they cannot compare with the latter in simplicity, accuracy, and conservation of finished product.

The three methods of X-ray examination—diffraction analysis, radiographic examination, fluoroscopic examination—are destined to play an increasingly important role in the rubber industry as it turns from natural to synthetic rubber. A vast fund of laboratory and production-line information is available to those manufacturers interested in this modern tool of industry.

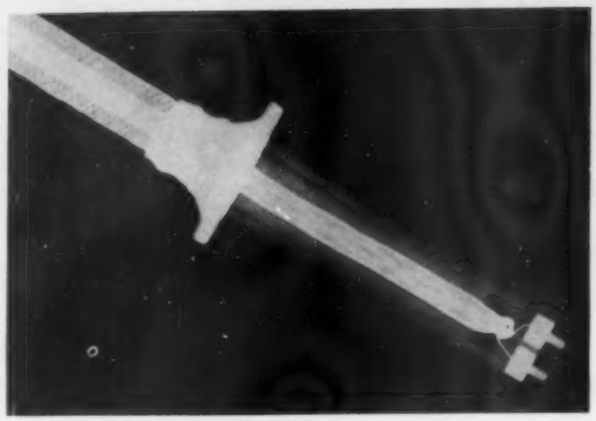


FIG. 3—This is a fluoroscopic study of a cable designed for operation on 50,000 volts. The central conducting core is surrounded by an insulating material, covered by a flexible metallic sheath.

Vinculux Method of Bonding Rubber to Metal

IN bonding rubber to metal or coating metal with rubber it is first necessary to prepare the surface of the metal so that it will take a good coat. This is generally accomplished by sandblasting, which has several objectionable features, including those of time and cost. A new method developed by Protective Coatings, Inc., 10391 Northlawn, Detroit, Mich., known as the Vinculux Method, is said to offer many advantages over the sandblasting process and to result in better bonded products.

The Vinculux Method makes use of a new material known as Vinculux, described as a metal conditioner, a rust inhibitor and a bonding "catalyst." Vinculux is a liquid and is applicable to all types of metal by any suitable method of application—dipping, brushing or spraying. According to its manufacturer, it removes oil and corrosion from the surface of the metal, inhibits oxidation, gives high bonding efficiency and acts as a "catalyst" for the prime coat required in the bonding of rubber to metal. It is non-inflammable.

In application, Vinculux is dipped, brushed or sprayed onto the metal. The surplus is then wiped off and the remainder dried. Where badly corroded surfaces are involved, they should first be wire-brushed to remove all loose rust and the surface then treated liberally with Vinculux to dissolve the remaining corrosion, after which the surface is flushed and dried. Another coating should then be applied, wiped off and dried. The action of the material on the metal reduces the possibility of corrosion prior to and following the application of the bonding agent or primer.

The manufacturers of Vinculux stress the point that it is not a substitute for but an improvement over sandblasting and pickling operations in preparing metal for bonding with rubber. Tests are reported to indicate an increase as high as 50% in the adhesion of rubber to metal first treated with Vinculux. Bonding adhesion tests by the Navy 90° method show bonds in the 900 lbs./sq. in. range. Of interest to all rubber manufacturers bonding rubber to metal or coating metal with rubber, Vinculux is especially of interest to those concerns which find it necessary to send the metal out to be sandblasted. The economy of applying Vinculux in the plant is obvious.

A Tire Is No Better Than Its Tube. (Service Bulletin No. 17). Rubber Manufacturers Association, 444 Madison Ave., New York City. 8½ x 11 in. 8 pp.

This latest R.M.A. bulletin has a three-fold purpose: (1) To explain and illustrate the common causes of tube failures, resulting from injuries or misuse; (2) To explain the principal points essential to maximum tube performance; and (3) To stress why a new casing should have a new tube. Preferential methods for removing and applying tires with the wheel on the car or mounting rack or with the wheel on the floor are described and illustrated.

What Every Employer Should Know About Labor Relations. Labor Relations Institute, 1775 Broadway, New York City. 5½ x 8½ in. 12 pp.

How management can meet today's crucial challenge is described in this booklet issued by the Labor Relations Institute, a non-profit organization sponsored by more than 1200 industrial executives throughout the United States. Basically, the booklet describes the method of operation employed by the Institute and outlines the services it is prepared to render to industry. Negotiation of union contracts is one of these services.

Amendment No. 3 to Supplementary Order No. M-15-b to Restrict the Use and Sale of Rubber

THE full text of Amendment No. 3 to the original Supplementary Order No. M-15-b, which restricts the use and sale of rubber, issued on January 23 by the War Production Board, constituting one of the first official actions of that board which succeeded the Office of Production Management, and to which the rubber industry is subjected until further notice, follows herewith:

WHEREAS, the further importation of crude rubber is imperiled; national defense requirements have created a shortage of rubber for the combined needs of defense, private account, and export; action has already been taken to conserve the supply and to direct the distribution of rubber to insure deliveries for defense and essential civilian requirements; and the supply now is and will be insufficient for defense and essential civilian requirements unless its use in the manufacture of products where such use is not absolutely necessary for the defense or essential civilian requirements is prohibited as hereinafter provided;

NOW, THEREFORE, IT IS HEREBY ORDERED THAT:

940.3 General Limitation Order

(a) Definitions. For the purposes of this Order:

(1) "Rubber" means all forms and types of crude rubber (including crepe rubber for soles or any other purpose) and all crude rubber (including scraps and trimmings) contained in any compound which has not been vulcanized, but does not include balata, gutta-percha, gutta siak, gutta jelutong, pontianac, reclaimed rubber, cured or vulcanized scrap rubber and Latex.

(2) "Latex" means the rubber solids contained in liquid latex in crude form, and in compounded liquid latex, which on December 11, 1941, had not been processed or mixed in such manner that further processing is necessary to prevent early spoilage.

(3) "Person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency, or any organized group whether incorporated or not.

(4) "War Order" means:

(i) Any contract or purchase order for material or equipment to be delivered to, or for the account of:

(aa) The Army or Navy of the United States, the United States Maritime Commission, the Panama Canal, the Coast and Geodetic Survey, the Coast Guard, the Civil Aeronautics Authority, the National Advisory Committee for Aeronautics, the Office of Scientific Research and Development.

(bb) The government of any of the following countries: The United Kingdom, Canada and other Dominions; Crown Colonies and Protectorates of the British Empire, Belgium, China, Greece, the Kingdom of the Netherlands, Norway, Poland, Russia and Yugoslavia.

(ii) Any contract or purchase order placed by any agency of the United States Government for material or equipment to be delivered to or for the account of the government of any country listed above, or any other country, including those in the Western Hemisphere, pursuant to the Act of March 11, 1941, entitled "An Act to Promote the Defense of the United States" (Lend-Lease Act).

(iii) Any contract or purchase order for material or equipment required by the Person placing the same to fill his contracts or purchase orders on hand, provided such material or equipment is to be physically incorporated in material or equipment to be delivered under contracts or purchase orders included under (i) and (ii) above.

(5) "Inventory" of a Person includes the Inventory of affiliates and subsidiaries of such Person, and the Inventory of others where such Inventory is under the control of or under common control with or available for the use of such Person.

(6) "Consume" means to use, process, stamp, cut, or in any manner change the form, shape or chemical composition of any Rubber or Latex.

(b) General Restriction on the Use of Rubber. From the effective date of this Order until otherwise ordered by the Office of Production Management, no Person shall consume any Rubber for any purpose, except (subject to the provisions of paragraph (d), one or more of the following:

(1) To manufacture products to fill War Orders; provided that no Person shall consume any Rubber to fill any such order until he has forwarded to the Rubber and Rubber Products Branch, Office of Production Management, a report showing:

(i) The name of the Person placing the order and his purchase order number.

(ii) The name of the Person to whom delivery is to be made.

(iii) The article to be manufactured and the quantities thereof.

(iv) The preference rating (if any), and how assigned.

(v) The respective quantities, by weight, of Rubber, Latex, and reclaimed rubber required.

(vi) The specifications (by number, if any).

(vii) The delivery schedules of the articles, in quantities, by months.

(viii) Such other information as may be required from time to time by the Office of Production Management.

(2) To manufacture products of the groups listed in List A; provided that no Person shall consume more Rubber during any calendar month, beginning with February, 1942, in the production of any such groups of products than a percentage of his average monthly consumption of Rubber in producing the same group of products during the twelve months' period commencing on April 1, 1940, and ending on March 31, 1941, the percentage for each group of products being that set forth opposite the heading of such group.

(3) To manufacture products of the groups listed in List B; provided that no Person shall consume Rubber for such purpose without the prior approval of the Office of Production Management.

(c) General restriction on the use of Latex. From the effective date of this Order until otherwise ordered by the Office of Production Management, no Person shall consume any Latex for any purpose, except subject to paragraph (d) one or more of the following:

(1) To manufacture products to fill War Orders; provided that no Person shall consume any Latex to fill any such order until he has forwarded a report complying with the requirements of sub-paragraph (b) (1).

(2) To manufacture products of the groups listed in List C attached; provided that no Person shall consume more Latex during any calendar month, beginning with February, 1942, in the production of any such groups of products than a percentage of his average monthly consumption of Latex in producing the same group of products during the twelve months' period commencing on April 1, 1940, and ending on March 31, 1941, the percentage for each group of products being that set forth opposite the heading of such group.

(3) To Manufacture products of the groups listed in List D; provided that no Person shall consume Latex for such purpose without the prior approval of the Office of Production Management.

(d) Manufacture according to specifications. Any of the products or materials whose manufacture is permitted by paragraphs (b) and (c) may be manufactured only in conformity with such specifications as may be issued from time to time by the Office of Production Management; provided, that until specifications for particular products or groups of products are issued by the Office of Production Management, the Rubber or Latex content by weight of any such products manufactured by any Person shall not exceed the Rubber or Latex content by weight of identical products manufactured by such Person on December 31, 1941, or on the most recent date prior to December 31, 1941, on which he manufactured that product or group of products.

(e) General restriction on the sale of Rubber and Latex. Until otherwise ordered by the Office of Production Management, no Person shall sell, trade or transfer the ownership of any Rubber or Latex, and no Person shall accept any such sale, trade or transfer of ownership, except (1) as expressly permitted by regulation prescribed by Rubber Reserve Company, or (2) in those cases in which specific authorizations may be issued by the Office of Production Management; provided that nothing in this paragraph shall be deemed to prohibit the sale of unvulcanized rubber products which were in finished and marketable form on December 11, 1941, or which have become finished and marketable at any time after that date pursuant to processing not prohibited by any orders or other instructions issued by the Office of Production Management.

(f) Reports of stocks of Rubber and Latex. Every Person who owns or has in his possession or under his control on the effective date of Amendment No. 3 of this Order any Rubber or Latex shall within fifteen days from such effective date file with the Rubber and Rubber Products Branch of the Office of Production Management a complete report setting forth by grades the amount of Rubber and the amount of Latex so owned, possessed or controlled by him, and the location and ownership thereof.

(g) Distribution of Rubber among plants. Each Company (which term when used in this paragraph shall include any corporation together with all other corporations controlling, and all other corporations controlled by, such corporation), which is a processor of Rubber or Latex and which operates plants in more than one community (all plants operated by the same Company in the same community being herein collectively referred to as a "Unit") shall immediately upon any distribution of Rubber or Latex for any calendar month among its Units which is at a ratio which differs materially from the ratio of processing or consumption by such Units during July, 1941, file with the Rubber and Rubber Products Branch of the Office of Production Management, a full report thereof showing clearly the reasons for such departure in ratio of distribution. In any case in which it appears that such change in ratio was not justified or proper, the Office of Production Management will take such action as it may deem appropriate.

(h) Limitation of inventories. No Person shall receive delivery of Rubber or Latex or products thereof, in the form of raw materials, semi-processed materials, finished parts or subassemblies, in quantities which shall result in an inventory of such material in excess of a minimum practicable working Inventory, taking into consideration the limitations placed upon the production of Rubber or Latex products of this Order.

(i) Miscellaneous provisions.

(1) Priorities Regulation No. 1. This Order and all transactions affected thereby are subject to the provisions of Priorities Regulation No. 1 (Part 944), as amended from time to time, except to the extent that any provision hereof may be inconsistent therewith, in which case the provisions of this Order shall govern.

(2) Appeal. Any Person affected by this Order who considers that compliance therewith would work an exceptional and unreasonable hardship upon him, or that it would result in a serious problem of unemployment in the community, or that compliance with this Order would disrupt or impair a program of conversion from nondefense to defense work, may appeal to the Office of Production Management by addressing a letter to the Rubber and Rubber Products Branch, Office of Production Management, Washington, D. C., setting forth the pertinent facts. The Office of Production Management may thereupon take such action as it deems appropriate.

(3) Applicability of Order. The prohibitions and restrictions contained in this Order shall apply to the use of material in all articles hereafter manufactured irrespective of whether such articles are manufactured pursuant to a contract made prior or subsequent to the effective date hereof, or pursuant to a contract supported by a preference rating. Insofar as any other Order of the Office of Production Management may have the effect of limiting or curtailing to a greater extent than herein provided the use of Rubber or Latex in the production of any article, the limitation of such other Order shall be observed.

(4) Violations. Any Person who willfully violates any provision of this Order, or who by any act or omission falsifies records to be kept or information to be furnished pursuant to this Order, may be prohibited from receiving further deliveries of any Material subject to allocation, and such further action may be taken as is deemed appropriate, including a recommendation for prosecution under Section 35 (a) of the Criminal Code (18 U. S. C. 80).

(5) Communications. All reports required to be filed under this Order, and all communications concerning this Order, shall, unless otherwise directed, be addressed to:

"Office of Production Management, Washington, D. C., Ref.: M-15-b."

(j) Effective Date. This Order shall take effect on February 1, 1942.

(P. D. Reg. 1 Amended Dec. 23, 1941, 6 F. R. 6680; O. P. M. Reg. 3 Amended, Sept. 2, 1941, 6 F. R. 4865; E. O. 8629, Jan. 7, 1941, 6 F. R. 191; E. O. 8875, Aug. 28, 1941, 6 F. R. 4483; sec. 2 (a), Public No. 671, 76th Congress, Third Session, as amended by Public No. 89, 77th Congress, First Session.)

Issued this 23rd day of January, 1942.

J. S. KNOWLSON,
Acting Director of Priorities.

LIST A TO SUPPLEMENTARY ORDER NO. M-15-b, AS AMENDED

Group 1—140 Per Cent

Conveyor belts and belting, elevator belts and belting, flat transmission belts and belting, concentrator belts and belting, hog beater belts and belting, industrial V belts and belting, chute lining, cleats and bucket pads, pulley lagging, screen diaphragms, belt splicing material.

Group 2—100 Per Cent

Polishing belts and belting, street sweeper belts and belting, hatter's belts and belting, round belts and belting.

Group 3—140 Per Cent

Acid hose, air drill hose, chemical hose, dredging sleeves, high pressure wired hose, industrial vacuum hose, oil suction and discharge hose, paper mill hose, pneumatic hose, railroad hose (all types), rotary drillers' hose, sand-blast hose, steam hose, suction hose, welding hose.

Group 4—100 Per Cent

Spray hose, brewers' hose, creamery hose, gasoline tank wagon hose, rubber-lined tanks, pipes and fittings (hard and soft).

Group 5—140 Per Cent

Sheet and strip packing, rubber covered rolls (except printing and business machines), car diaphragms, switchboard mats and matting.

Group 6—25 Per Cent

Gaskets, except for consumers' goods. Molded, extruded and lathe—cut goods, except for consumers' goods. Tubing, except for consumers' goods. Chemically blown sponge rubber goods, except for consumers' goods.

Group 7—80 Per Cent

Printers' rollers, engraving and printing plates, offset blankets, cutting rubbers, suction cups for printers' equipment.

Group 8—180 Per Cent

Fire hose, mill hose, washers and gaskets for fire fighting equipment, tubing for fire fighting equipment.

Group 9—100 Per Cent

Acoustic aids, anaesthesia equipment, plaster bowls, dental dam, chip blower bulbs, tubes, tubing and stopples (biological, laboratory and medical), urinals, surgeons' gloves, colostomy outfits, pitcher bags, orsat bags, pessaries, umbilical belts, dilators, tourniquets, cautery bulb sets, blood pressure equipment, evacuators, irrigators, sinus bulb sets, catheters, invalid rings, operating cushions, bedpans, surgeons' aprons, surgical tape and bandages, vaccine caps, medicine droppers, hospital sheeting (hospital use), trusses, maternity girdles, surgical stockings and abdominal supports.

Group 10—75 Per Cent

Water bottles, fountain syringes, ice bags, bulb syringes (ear, ulcer, nasal, rectal, vaginal, infant, politzer air), metatarsal pads.

Group 11—100 Per Cent

Nipples, nursing bottle caps, breast pumps, breast shields.

Group 12—70 Per Cent

Quarter lining, cements for the manufacture and repair of shoes.

Group 13—100 Per Cent

Electricians' and industrial gloves (without fabric), with or without rubberized fabric gauntlets.

Group 14—100 Per Cent

Deep-sea diving equipment, occupational protective clothing, other than footwear and gloves.

Gorup 15—60 Per Cent

Rubberized fabric for firemen's and policemen's clothing.

Group 16—30 Per Cent

Plain oxfords and laced-to-toe gym bals with black toes, foxings and toe caps only.

Group 17—40 Per Cent

Waterproof boots, pacs, arctics, gaiters and overshoes made of cloth and black rubber.

Group 18—80 Per Cent

Hollow tank balls and floats, washers, including fuller balls and valves, which are used to control the flow of liquids.

Group 19—100 Per Cent

Vulcanizing materials, patches, cements, blow-out shoes and similar items for the repair of tires, tire casings and tubes.

List B to Supplementary Order No. M-15-b, as Amended

Group 1

Jar rings, container sealing compounds.

Group 2

Toplifts and toplifting material, soles and tops, soling material.

Group 3

Compounds for insulating wire and cable (except for building wire types R. P. and R. H. and flexible cord types S., S. J., S. V. and P. O. S. J. either 64 or 32).

Group 4

Tires, tire casings and tubes, truck and bus, passenger, airplane, bicycle, motorcycle, farm implement, industrial, highway maintenance equipment, off the road.

Group 5

Cements for retreading and recapping tires, capping stock, filler strip, stripping stock, cushion stock.

List C to Supplementary Order No. M-15-b, as Amended

Group 1—120 Per Cent

Industrial V belts and belting.

Group 2—100 Per Cent

Anaesthesia equipment, dental dam, tubes and tubing (biological, laboratory, medical), surgeons' gloves, pessaries, prophylactics.

Group 3—100 Per Cent

Electricians and industrial gloves (without fabric) with or without rubberized fabric gauntlets.

Group 4—70 Per Cent

Cement to be used in the manufacture of new shoes.

List D to Supplementary Order No. M-15-b, as Amended

Group 1

Container sealing compounds.

Group 2

Tires, tire casings and tubes.

Nervastral Rubber Reclaiming Processes

THE Nervastral processes for the reclaiming of rubber, said to be the result of ten years of intensive study of the subject in Europe, are currently being offered in the United States by the Rubber & Plastics Compound Co., Inc., 30 Rockefeller Plaza, New York City. Some information on these processes is contained in a general statement recently issued by the company, from which the following has been taken:

Some of the Nervastral processes, according to the company, do not require grinding and powdering of the scrap before depolymerization, nor do they require the use of boilers, autoclaves, high pressure tanks, alkalis, oils, acids, toxic matter, or any washing and grinding operations. Thermochemical treatment is effected in about 60 to 120 minutes, exclusive of the time required to reach the physical conditions of temperature and pressure of the treatment. An interesting claim for the processes is that they permit the treatment of scrap containing fabric, such as tire carcass, to obtain a finished product wherein the fabric is incorporated in the mass. Another is that they result in a yield in weight corresponding to that of the treated scrap, including the fabric, save for a negligible loss. The original color of the scrap is not changed during the treatment.

The cost of constructing a reclaiming plant to use one of the Nervastral processes, the company states, may be practically amortized in a year. Although specific information is lacking, the claim is advanced that the manufacturer using as little as 2,000 tons of reclaim a year can save upwards of $80,000, thus paying for the installation out of savings. One point stressed by the Rubber & Plastics Compound Company is that the reclaim secured by using one of the processes available is equivalent to that of a commercially-made alkali reclaim, and that it may be used in the manufacture of any rubber product now being made with reclaim. The company maintains a laboratory for the study of special problems encountered by its customers.

Editorials . . . . . .

Synthetic Rubber the Only Answer

THE wisdom behind the recent decision of the government to go all-out on a synthetic rubber program, designed to carry the burden of meeting the rubber requirements of the United States, is borne out by events of the past few weeks. The Japanese are staking their all on a quick victory in the Pacific before the industrial might of this country reaches the point where there will be sufficient planes, tanks and military craft to push them back to their own little island and then teach them the lesson they so well deserve.

Before the Victory Program gets into full swing the Japanese will have accomplished a good part of their curent aim. At this writing Singapore is fighting desperately but against such tremendous odds that it is doubtful whether that fortress can be held. With the loss of Singapore the safety of the Netherlands East Indies is in doubt, since the Japanese will have almost free access to the waters which surround the various islands. Bombing attacks on Surabaya and other important Indies centers, following previous actions of the Japs, hint at early invasion attempts. All of which means that there is a strong possibility that shipments of crude rubber from the Far East may be cut off completely within the near future.

There can be no doubt that in the long run the Japanese will be forced to give up their gains in the Far East and relinquish rubber territories now held. The major question seems to be how long will it take the United Nations to gather sufficient strength to reach the necessary superiority in planes, tanks and ships to take back these and other valuable territories? There can be no definite surmise as to specific time, but from all present indications it will take several years, despite the optimistic statement by Jesse Jones that we will again be getting large supplies of crude rubber from the Far East by the end of 1943. The Japanese have proved themselves fanatical fighters and they will fight just as hard to hold on to what they have as they did to get it.

Therefore, faced with the complete loss of shipments of crude rubber from the Far East, plus the knowledge that we can not count on Latin America for any great quantities of rubber until 1947 or 1948, that continued production of reclaim at the present rate for more than a two or three year period is doubtful, and that the guayule planting program, finally approved by Congress, will not produce more than 50,000 tons a year for the next few years, only the greatly increased production of synthetic rubber can tide us over the period until supplies of crude may again be available in sufficient quantities to guarantee sufficient rubber for both military and essential civilian requirements.

Although there still appears to be considerable doubt in some quarters whether the huge synthetic rubber program, which has as its aim productive capacity of 400,000 tons a year, can be achieved within 18 to 24 months, there is equal confidence expressed in others that the job can be done. Assurances have been received from petroleum officials that all of the necessary butadiene will be forthcoming. Arrangements for the construction of facilities for styrene and other basic ingredients are proceeding rapidly. The United States has never failed to meet any drastic emergency —and this is just such an emergency. Rubber is as important to the war program as is steel. In President Roosevelt's own words, the job *can* be done, it *must* be done, it *will* be done.

CURRENT NEWS OF THE MONTH

NEW RESTRICTION ORDER LIMITS PRODUCTION OF RUBBER GOODS TO SPECIFIC PERCENTAGES

ONE of the first administrative actions taken by the War Production Board, organized to succeed the Office of Production Management, with Donald Nelson appointed as supreme war production head, was to scrap all previous rubber regulation orders and to institute a new order which provides more rigid control of the use of crude rubber and latex. Issued under date of January 23 as Amendment No. 3 to Supplementary Order No. M-15-b to Restrict the Use and Sale of Rubber, the new order sets forth the uses for which rubber and latex will be made available to the industry for manufacturing purposes. It is designed to curtail consumption by approximately 75% of recent annual consumption, set in some quarters at 700,000 tons. Except to fill strictly war orders, permissible uses are restricted each month beginning February 1 to certain percentages of average monthly consumption of the 12-month period ended March 31, 1941. The full text of the amendment appears elsewhere in this issue.

The latest order, which may soon be withdrawn in favor of a new one which may substitute a direct allocation program, although it is more likely that the change to allocations will be effected gradually, also provides that until otherwise ordered no one may sell, trade or transfer any crude rubber or latex, including compounded latex, without permission of the War Production Board or the Rubber Reserve Co. This ban, which to all intents and purposes prohibits the sale of so-called free rubber, strengthens the government's control over all stocks not actually held by the Rubber Reserve Co.

Permissible Uses of Rubber

Under the terms of the order rubber used for the manufacture of footwear for workmen and athletic use is cut to 30% of the amount used in the base period; waterproof footwear for civilian use, 40%; equipment for printing and publishing, 80%; flat goods, such as water bottles and ice bags, 75%; shoe cements and quarter linings, 70%; plumbers' supplies, 80%; firemen's and policemen's clothing, 60%; miscellaneous rubber goods, 25%. Some products, such as belting and hose used in the manufacture of consumer goods, hospital and surgical supplies, infant feeding products, industrial protective clothing, and tire repair materials, may consume as much rubber as in the base period. Others, such as essential heavy industry belting, hose and packing, may consume more than that used in the base period, in this case 140%.

Latex may be used for the following purposes on the basis of percentages indicated: Industrial V-belts and belting, 120%; surgical and medical equipment, 100%; electricians' and industrial gloves, without fabric, 100%; cement for new shoes, 70%.

Specific permission must be secured from the War Production Board for the use of rubber in the manufacture of tires, casings and tubes of all types, jar rings and container sealing compounds, toplifts and toplifting materials, soles and tops, soling materials, compounds for insulating wire and cable (with certain exceptions), and retreading and recapping materials. Similar permission must be secured for the use of latex in container sealing compounds and tires, casings and tubes.

Manufacture of all the products permitted under the new order must be in conformity with specifications laid down from time to time by the W.P.B. Since it is known that technical studies are now being conducted by the board it is logical to assume that reductions in the weight of rubber used in permissible products may soon be officially reduced, thus furthering the conservation program. In the meantime, however, the order specifies that the rubber and latex content of any product cannot be increased.

Special Provisions in Order

In addition to the customary appeal, violation and other provisions of priority orders, the new rubber consumption order contains three very important features, as follows:

1. Companies which have subsidiaries in various communities must advise the W.P.B. if distribution of rubber or latex among the various units differs in any month from the ratio of consumption of these units during July, 1941.

2. Anyone who owns, possesses, or has under his control any rubber or latex as of February 1 must file a complete report with the board showing by grades the amounts involved.

3. Persons filling war orders must file complete reports with the board showing among other things the specifications, quantities and delivery dates involved in each transaction.

The order specifically states that the regulations are in addition to the filling of war orders, which include those placed by the Army and Navy, certain other government agencies, those designated for foreign governments, and Lend-Lease contracts. It is also emphasized that the regulations do not apply to the use of reclaimed rubber. It should be pointed out that the order does not specify the products which can not be made of rubber, but lists percentage figures for those which can be manufactured.

The latest consumption regulation order sounded the death knell for many civilian rubber products, although the ingenuity of most manufacturers of such products is expected to result in the continued production of many such products from substitute materials of one kind or another. Wherever reclaimed rubber can meet the specifications required it will undoubtedly be put to use.

Memphis Meeting in Doubt

Just as this issue went to press it was learned that the Executive Committee of the Division of Rubber Chemistry, A.C.S., was being polled to determine whether in the opinion of the committee the Division should actually meet in Memphis, Tenn., in conjunction with the 103rd meeting of the parent society to be held in that city from April 20 to 24. Some doubt has been expressed as to the number of members of the Division who would attend the meeting at Memphis, considerably off the beaten track insofar as the rubber industry is concerned. A decision will be made by the Executive Committee in the next few days but at this writing it appears that the Division's spring meeting may be called off entirely and the next meeting will be held in the Fall.

The Pioneer Rubber Co., of Willard, Ohio, one of the large suppliers of household gloves, banned under the order, is already in production on a glove made entirely of reclaim. Although these gloves will not give the same performance as those formerly made of latex they are "almost as good" according to J. C. Gibson, president of the company. A manufacturer of bathing caps has turned to a cap made of cotton, coated with pyroxylin. A baby pants manufacturer is also experimenting with a pyroxylin-coated fabric. Many mechanical goods, especially those intended for replacement purposes in domestic appliances, are being made of reclaim. Leather, too, is finding use as a substitute.

Foundation Trade Wins Appeal

The foundation garment industry was faced with the possibility of losing its complete supply of rubber thread, thus necessitating a complete change of style. An appeal made by the industry to the Rubber & Rubber Products Branch of the W.P.B., however, has resulted in a decision to allot small quantities of rubber for this purpose, although the amount to be allotted will not be made public. The hosiery industry, in the same predicament, lost its appeal and for the time being no rubber for such purpose will be allotted. This industry used approximately 1,083,756 pounds of rubberized yarn last year, or approximately 180 tons of rubber after allowing for the weight of cotton and other coverings on the yarn. Normal consumption of rubber in the foundation garment field runs to about 2,000 tons annually.

In the meantime activity in other branches of the government concerned with the rubber situation has continued. Congress passed the guayule bill which provides for the cultivation of 75,000 acres; assurances were received that the government could achieve its 400,000 ton-a-year synthetic rubber program; amendments to the tire and tube rationing order were issued; the growth of rubber cultivation areas in South American and Central American countries was reported. All of these activities are covered in greater detail elsewhere in connection with this article.

Criticism of Program Heard

Considerable criticism of the situation in which the United States finds itself with respect to its rubber supply was heard in the past month. Senators Downey and O'Mahoney attacked delays in the government acquisition of rubber and other war materials to meet war and civilian needs. Thurman Arnold, head of the anti-trust division of the Department of Justice, intimated that "certain interests" had delayed the synthetic rubber program, but declined to enlarge on this intimation. William O'Neil, president of General Tire, declared the government was wasteful of rubber, demanding 40,000-mile tires for gun carriages "which won't run more than 1,000 miles," and stated "there is no necessity for a rubber panic." J. Penfield Seiberling, president of Seiberling Rubber, told the Small Business Committee of the House that our rubber supplies were large enough to meet military and "essential" civilian needs for two years, even though imports might be stopped.

Jones Has Optimistic Note

Jesse Jones, Secretary of Commerce, and head of the R.F.C., told the Banking Committee of the House on February 2 that he believed we will be getting all the rubber we need from the Dutch East Indies by the end of 1943, despite the present Japanese threat in that area. He warned, however, that it was still highly necessary to ration rubber "if we intend to win this war." He said that with rationing the nation "can get along for about a year and a half" with its present supply of rubber and that synthetic rubber plants with capacity of 400,000 tons annually will be operating by that time. Executives in the rubber industry are not as optimistic as Mr. Jones concerning the time goal set for this program. Mr. Jones also revealed that the United States was still receiving rubber imports at the rate of 35,000 to 40,000 tons monthly and that a total of 114,000 tons had been received since the outbreak of war with Japan.

In addition to rubber conservation methods voluntarily being applied by various rubber manufacturers, largely in the form of simplification of lines and reduction of crude rubber content in many industrial products, the War Department, according to an announcement made on January 29, has formulated a program whereby approximately 43,000 long tons of rubber will be saved during the next two years. By an agreement between the Army, Navy and Marine Corps it has been decided to accept for non-combat uses automotive tires manufactured from a modified compound containing a percentage of reclaimed rubber considerably higher than is at present being used.

The program, as formulated is based upon three essential steps as follows:

(1) To reduce the amount of rubber wherever possible by substitution of less critical materials in items required by the War Department.

(2) To eliminate all non-essential items entirely.

(3) To standardize and simplify products requiring rubber, thereby reducing the number of items that would otherwise have to be carried in stock.

Largest Savings in Tires

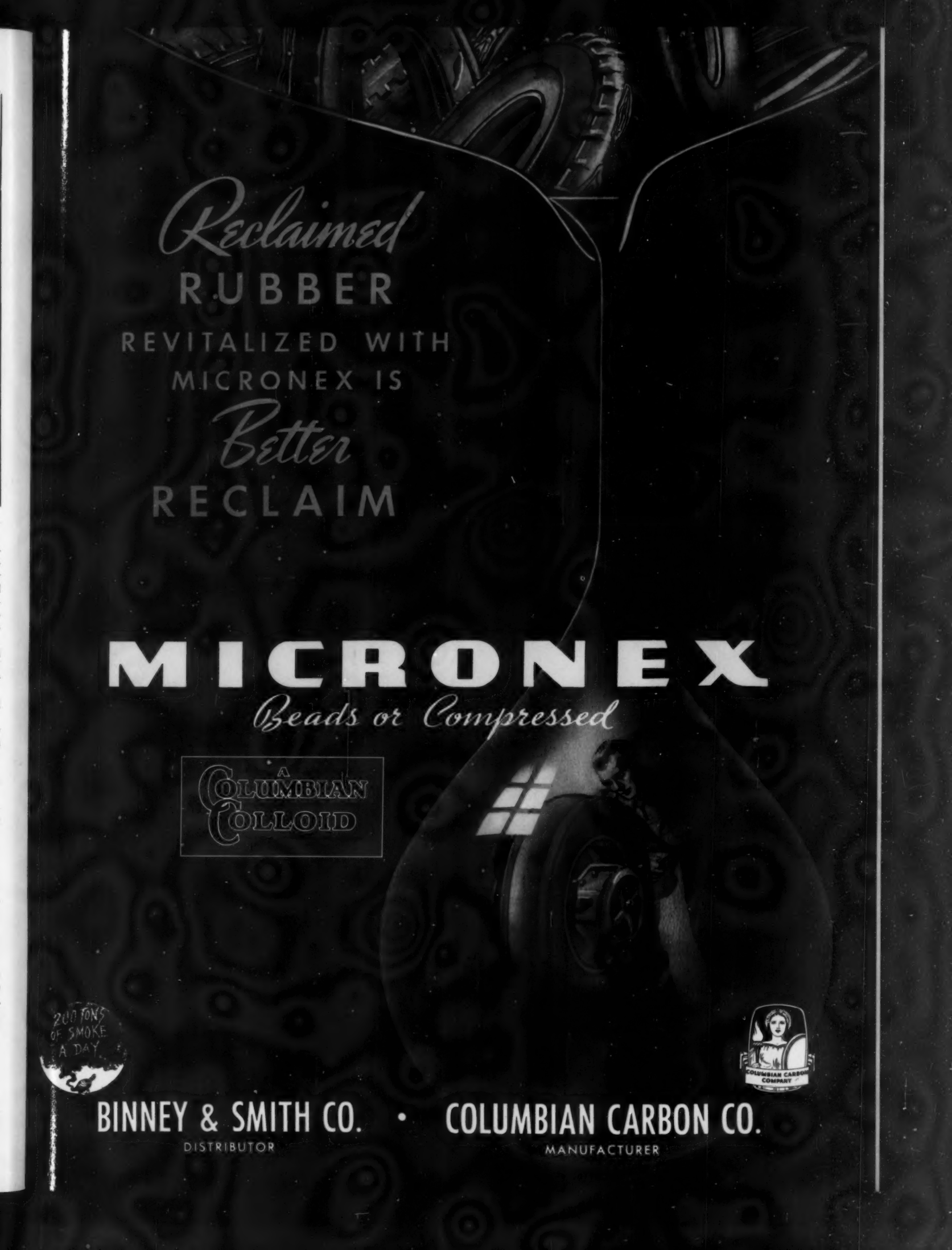
Since approximately 60 per cent of the Army's rubber requirements go into automotive tires, the largest single savings will be made in that item.

However, specifications for other essential Army materials have been altered further to conserve crude rubber. The rubber content, for example, of rubber boots is being reduced from 62 to 47 per cent and the rubber in face blanks for gas masks will be cut 20 per cent without in any way impairing their effectiveness. Combs for enlisted men are already being made of plastics rather than rubber.

NEWHALL HEADS RUBBER BRANCH OF WAR PRODUCTION BOARD

Arthur B. Newhall, who was associated with the Hood Rubber Company for more than twenty years and acted as executive vice-president of the B. F. Goodrich Company for a short period in 1938-39 before resigning to become vice-president of Talon, Inc., has been appointed Chief of the Rubber & Rubber Products Branch of the Division of Civilian Supply of the War Production Board, succeeding Willard Helburn who resigned to return to private enterprise.

Mr. Newhall has been associated with the government for the past several months as Deputy Director of the Division of Purchases of the Office of Production Management, which has since been superseded by the War Production Board, with Donald Nelson at its head. The appointment of Mr. Newhall was rereceived with considerable favor by both management and labor in the rubber industry, both factions of which have long been clamoring for the naming of a rubber executive.


Reclaimed
RUBBER
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Beads or Compressed
A COLUMBIAN COLLOID
200 TONS OF SMOKE A DAY
COLUMBIAN CARBON COMPANY
BINNEY & SMITH CO.
DISTRIBUTOR
COLUMBIAN CARBON CO.
MANUFACTURER

RECLAIM REINFORCEMENT

THE established principles of Micronex reinforcement of rubber apply with equal force to reclaimed stocks. For many important purposes natural rubber is virtually useless without Colloidal Carbon, and similarly compounds made with regenerated rubber need Micronex if designed for dynamic use.

By far the greatest proportion of reclaim for the rubber industry is in the form of whole tire stock. This most important type may be pictured as consisting of a mixture of tread rubber blended with carcass and cushion gums, with the tread particles maintaining their identity as discrete particles in a matrix of softer material which is deficient in reinforcing colloidal carbon.

Compounding studies on the carbon loading of whole tire reclaim demonstrate the need for reinforcement. Just as additional sulphur is required to revulcanize so, also, is additional Micronex necessary to revitalize regenerated rubber. Whether blended with new crude or used straight, the requirements for Colloidal Carbon reinforcement fall closely in line with ratios well established for use with new rubber.

Thus the reapplication of well recognized and established principles supplies the answer to one important phase of the rubber compounding problem of the present day.

•

Micronize Regenerated, As Well As New Rubber,
FOR MAXIMUM TENSILE STRENGTH
FOR MAXIMUM RESILIENT ENERGY
FOR MAXIMUM SERVICE

•

BINNEY & SMITH CO.
DISTRIBUTOR

COLUMBIAN CARBON CO.
MANUFACTURER

Steel wheels will be substituted for rubber on such portable engineering equipment for the Army as concrete mixers and portable air compressors.

Steps have been taken to reduce the amount of rubber used in tank treads and experimental orders have been given for metal instead of rubber tank tracks. Foam sponge rubber will be eliminated from seat cushions, back rests, etc., in all Army vehicles.

The modified compound accepted in the Army, Navy, and Marine Corps agreement will be accepted also in tires manufactured for shipment by the Lend-Lease Administration and the Board of Economic Warfare.

Further steps in the program to reduce the amount of rubber required for Army automotive tires include the establishment of a minimum skid depth and reduction in the gauge of all tubes. An actual reduction has also been made in the number of tire sizes needed for Army vehicles. Both the Ordnance Department and the Quartermaster Corps have tentatively decided on a list of sizes which will materially cut down the number of tires kept in storage all along the line from the plant to the vehicles in the field. Studies are also being made in an effort to reduce the quantity of rubber needed for Air Corps equipment and combat vehicles.

Simplification Programs Listed

An idea as to simplification programs instituted in the industry is found in the announcement by various tire manufacturers. Goodrich has developed 11 combination sizes to fill all the needs of 28 balloon and high pressure casings. Firestone has eliminated more than 100 specialized tires used by its customers late in 1940 and has discontinued two combination sizes of balloon and high-pressure tires and 10 high pressure sizes, thus reducing the number of tires in these sizes from 24 to 10. Goodyear and U. S. Rubber have accomplished similar savings.

The industry as a whole is heartily encouraged at the rapidity with which equipment is being diverted to war work. Leading tire manufacturers, particularly, have made substantial progress in diversifying their output, and accordingly the sharp decline in tire sales and other items using large quantities of crude rubber will not be as severe a blow as first thought. Defense orders already constitute as much as 50 to 60% of total productive capacity and workers are being swung over to war work far more rapidly than believed possible.

Ceilings on Rubber Products

Ceiling prices for the three grades of camelback which may be manufactured under the special order recently issued by the O.P.M., before it was taken over by the War Production Board, were established by telegram on January 19 by the O.P.A. A formal schedule of maximum prices is being prepared and will be issued in the near future. In the meantime, manufacturers were requested not to charge more than 28c a pound for camelback containing 57½ to 62½% crude rubber; 23c for the grade containing 38 to 48%; and 18c for that containing not over 20%. These prices correspond to prevailing market levels for equivalent grades. The allocation of camelback for the month of February was restricted by executive order for use on truck tire sizes only.

Manufacturers of rubber soles and heels, who are forced to revise their lines in view of the new restrictions on rubber, were asked by the O.P.A. on January 26 not to make any sales of these new items without consulting the O.P.A. or receiving notice to proceed from that office. The request was designed to forestall a chaotic price condition resulting from changes in production. Physical data on any new lines contemplated must be filed with the O.P.A.

Formal price ceilings on wire, cable and cable accessories were set in Price Schedule No. 82, issued by the O.P.A. on January 30. The order holds maximum prices to October 15, 1941, levels, and supplements the informal request made to the industry on October 29, 1941. It covers all types of rubber-insulated wire and cable among other types.

Cultivation of Crude Rubber Proceeds in Latin American Countries

Further information concerning the cultivation of crude rubber in Latin American countries was revealed by visiting dignitaries in the past few weeks. Haiti has set out vast rubber plantations which will eventually employ 50,000 workers and produce 30,000 tons of rubber annually, according to Frank C. Magloire, chief of the Division of Agriculture of Haiti, now in this country on a business visit. The Haitian project is under the supervision of the Societe Haiti Americaine de Development Agricule, which has a capitalization of $5,000,000. The plantations are expected to begin exporting rubber by 1947, Mr. Magloire said.

All seeds planted in Haiti, largely through the help of the U. S. Department of Agriculture, have thus far developed satisfactorily. No estimates are available as to the cost of producing rubber in that country, but it is believed that large quantities of cheap labor and quick transportation are on hand and the final cost will be below that of synthetic rubber.

Means of increasing the production of rubber in Brazil for immediate shipment are being discussed with the proper American authorities by Arthur de Souza Costa, Finance Minister of Brazil, who arrived in this country early this month accompanied by a full technical staff. Eleven experts of the Department of Agriculture are already on their way to Brazil and other Latin American countries to ascertain the possibilities of obtaining major supplies of rubber from wild trees growing in these countries. Three parties of two experts each have been delegated to survey Brazilian possibilities alone.

One proposal which is said to be receiving consideration in the huge war pool contemplated for Latin American countries is the dredging of a 60-mile canal to connect the Amazon and Orinoco rivers in Brazil. The canal would connect the Rio Negro, a tributary of the Amazon, with the Casiguiare river, which feeds into the Orinoco, thus providing improved transportation facilities for rubber and other commodities. Since the canal could not conceivably be constructed in less than four or five years it would not be of material help in the current emergency, but would definitely help keep down the cost of Brazilian rubber in the future.

Johnson Explains Ford Development

According to Archibald Johnston, manager of the Ford plantations in Brazil, currently visiting the factory at Detroit, all the rubber needed by the United States can be grown in the Western Hemisphere but it will require at least twelve years to bring sufficient acreage into production and an enormous quantity of labor will have to be moved into rubber-growing areas. With regard to the Ford development in Brazil he stated that it takes thousands of workers to operate a big rubber plantation and the labor just does not exist in the Amazon Valley. What labor is available, he said, has tended to shift to the cotton and coffee plantations farther south. Because of immigration restrictions and the necessity of posting bonds to cover possible claims made by the immigrant against his employer Ford has given up the project of importing labor as being too impractical.

In his statement, made from Detroit on January 31, Mr. Johnston also revealed that in Brazil the company was also under a handicap of climate as compared with the Far East. Prolonged dry spells in Brazil, he claimed, delay the maturity of trees about two years as compared with growth in Malaya. Problems of leaf disease, however, have been fairly well minimized and disease-resistant strains are available. Eventual capacity of the Ford plantations, according to Mr. Johnston, will be approximately 38,000 tons a year, providing arrangements to bring in outside workers are possible.

Some interesting comments regarding the "scorched earth" policy in Malaya were made by Sir John Hay, representative of the International Rubber Regula-

tion Committee, currently visiting Washington. Sir John stated that a full "scorched earth" policy, such as practiced in Russia during the German invasion, was impossible of application. Big, tough, moist and widely separated, the rubber trees in Malaya might be seriously scorched by fire in February or March, when it is relatively dry, but not in the rainier months. Even machine-gun fire could do comparatively little damage to the 500,000,000 trees in the country.

In Sir John's opinion the "scorched earth" policy in Malaya applied only to "all kinds of plants and machinery, particularly processing plants." He conceded that it was possible for the Japanese, whose normal consumption does not exceeed 80,000 tons a year, to tap the trees, coagulate the latex, smoke it in the sun, and then ship it to Japan or other points controlled by that country.

Rabbit Bush as Rubber Source

The latest source of crude rubber in the United States which has been overlooked to date, according to scientists of the University of California, is the common rabbit bush, a species of Chrysothamnus or golden shrub, a distant relative of guayule, which grows in the alkali deserts of six western states. In a series of investigations conducted several years ago Dr. T. H. Goodspeed, botanist, and Dr. H. R. Wellman, agricultural economist, both associated with the university, determined that wild rabbit bush contained 3 to 7% rubber on a dry weight basis and that it could be harvested in much the same way as guayule. Dr. Goodspeed estimated that the rubber from rabbit bush would cost about 45 cents a pound and recommended that the government make available $25,000 to the university for a new survey which might indicate supplies up to 250,000 tons.

Commercial Plant for Milkweed

At the same time it was announced by D. B. Lewis, machinery executive of Los Angeles, that the first plant for the commercial production of rubber from the ordinary milkweed will be established in that city "within a few weeks." William A. Sharpe, of South Alhambra, California, a graduate of the University of Michigan, and an associate of Mr. Lewis, is said to have developed an economical method of producing good quality rubber from wild plants that take only ninety days to mature. Tests are said to have indicated that it is possible to obtain more than 100 pounds of rubber from a ton of milkweed. The best variety will yield 35 tons to the acre. The tests were conducted on a small pilot plant located in South Alhambra. Goodrich is reported to have conducted some tests with the rubber produced from this plant.

Petroleum Officials Predict Achievement of Synthetic Rubber Goal

Little has been heard officially from Washington regarding the synthetic rubber situation since the announcement last month by Jesse Jones, Federal Loan Administrator, of the government's program to construct sufficient facilities to produce 400,000 tons of synthetic rubber annually. Detroit and Toledo are two cities believed to be under consideration for the location of new plants. A site near Martins Ferry, Ohio, was also reported to be receiving some thought.

Many technical difficulties confronting the government in its ambitious program have been avoided by the pooling of patents and technical information, according to Dr. E. R. Weidlein, chief of the Chemicals Branch of the War Production Board. Enough raw materials are already in sight for at least half of the proposed program, Dr. Weidlein stated. These materials, principally butadiene and styrene, will be provided by the chemical industry.

Butadiene can be produced as a by-product in the 100-octane gasoline plants now being constructed to provide aviation gasoline. The butadiene can be extracted without cutting down the amount of aviation gasoline produced and without restricting output of other petroleum products. If high priority ratings are assigned for the necessary quantities of non-corrosive steel for equipment, Dr. Weidlein said, sufficient capacity for 200,000 tons of synthetic rubber will be reached by the beginning of 1943.

Authorities in the petroleum field generally back up the statements made by Dr. Weidlein. One such authority said that the industry would probably be called upon to supply a top requirement of some 35,000 barrels of butane daily although if necessary that could be stepped up to 90,000 to 125,000 barrels. It is believed, however, that a thorough technical analysis of production possibilities must be made to determine how much of the ingredients required in the manufacture of synthetic rubber should be produced from natural gas and how much from refinery gas. This decision will probably lead to selection of the sites for the new synthetic plants planned and may be one reason why decisions on such sites are being held up by Washington.

Announcements concerning the construction of facilities for the production of the basic ingredients required in the manufacture of synthetic rubber came from various sources. R.G.A. van der Woude, president of the Shell Union Oil Corp., in a statement accompanying that company's annual financial report, indicated that Shell is discussing with the government the erection of a plant to produce thousands of tons of butadiene annually. This is in addition to a plant completed by the company last year which is already producing butadiene at the rate of several thousand tons a year.

W. S. Rodgers, president of the Texas Co., one of the nation's largest producers of gasoline, announced that the government had advanced the company $8,500,000 as a loan for refinery expansion and that one of the new units to be constructed will produce toluene and have facilities for the manufacture of butadiene.

Search for New Types Continues

Search for new types of synthetic rubber continues. In Washington, Dr. Henry G. Knight, chief of the Chemistry and Engineering Bureau of the Department of Agriculture, revealed that experiments are under way for the conversion of agricultural commodities, such as wheat and corn, into synthetic rubber. Signal progress is said to have been made in this direction at the regional laboratory maintained by the Bureau in Peoria, Ill. The process, developed by four chemurgy experts—Dr. L. M. Christensen of the University of Nebraska, W. K. McPherson of Alabama Polytechnic Institute, Harry Miller of the University of Missouri, and Dr. L. A. Underkofler of Iowa State College—consists of three stages, according to Dr. Knight, as follows:

(1) A special fermentation process under which farm commodities are made into butylene glycol, resembling glycerine but somewhat thinner;

(2) Conversion of the butylene glycol into butadiene;

(3) Chemical transformation of the butadiene into synthetic rubber.

The possibility of obtaining 50,000 to 100,000 tons of synthetic rubber a year from a now unused product of the Florida Everglades was suggested by Clarence R. Bitting, president of the United States Sugar Corp. According to Mr. Bitting, laboratory tests have proved that the product, which he refused to name or identify, can successfully be used as a basic ingredient for the manufacture of synthetic rubber which could be produced at a cost of 40 to 50 cents a pound. He set the cost of the necessary mechanical installation at approximately $7,000,000 and added that a plastic can be made from the same material once the rubber situation is alleviated.

Synthetic Plant for Sweden

Faced with a drastic shortage of crude rubber due to the war, Sweden is considering the possibility of constructing a synthetic rubber factory sufficient to produce the rubber needed by the local manufacturing industry to continue operations. The rubber will be manufactured from carbide, following an American process, and will be satisfactory for insulating and oil-resisting purposes only. The Swedish General Electric Co., the Swedish Super Phosphate Co., and the large Mo & Domajo Pulp Co., are collaborating in the effort.

Congress Approves Guayule Bill Calling for Cultivation of 75,000 Acres

The bill designed to give the Secretary of Agriculture authority to lease 75,000 acres of land to grow guayule, and to process the resulting yield, was passed by the House of Representatives on February 5. It had previously been passed by the Senate on January 15, but because several amendments were incorporated in it by the House it went back to the Senate for final passage. The changes made in the bill were not considered controversial in government circles and accordingly swift acceptance by the Senate is expected. (EDITOR'S NOTE: The Senate passed the amended bill on February 9).

Aside from the authority to lease land in areas where guayule can be grown, particularly in California, Arizona, New Mexico and Texas, the bill as approved by the House, where it was originally introduced by Representative Anderson of California, authorized the payment of $2,000,000 to the Intercontinental Rubber Co. for its processing plant, nurseries and 23,000 pounds of seed of an improved strain. Whereas the bill as passed by the Senate would permit the planting of guayule anywhere in the Western Hemisphere, the House bill restricts such planting to the continental United States. The Secretary of Agriculture may exercise his powers in respect to the growing of other rubber-bearing plants. Several such plants are believed under consideration.

Now that the bill has passed the House, and has received the full approval of the Senate, several interesting questions come to the fore. At what price will guayule be sold when cultivated on such a wide scale as provided in the bill? Guayule now sells at around 25 cents per pound, but it is believed that wide-scale planting and processing will bring the price down to about 15 cents a pound. How will it be sold? Although no official statement has been forthcoming from Washington, it is logical to assume that all guayule rubber grown in the United States will be turned over to the Rubber Reserve Co. for resale to the rubber manufacturing industry.

How much guayule rubber will be available and when? This is one of the most difficult questions of all to answer. The amount of seeds to be purchased from Intercontinental Rubber as provided in the House bill—23,000 pounds—is sufficient to plant approximately 55,000 acres, but how soon such acreage will be planted depends on the Department of Agriculture. Present plans call for immediate action.

Since the Department has gone on record as favoring no less than a four-year harvest, it is to be presumed that no government-sponsored guayule will be available for at least four years—unless the urgent need for rubber calls for an earlier harvesting of whatever acreage may have been planted in a shorter period. It must be borne in mind that the seedlings of densely planted guayule can be harvested in about a year, with a yield of a little more than a 1,000 pounds per acre, but the yield goes up and the cost goes down if the plants are permitted to grow for four to seven years.

The Department of Agriculture, it is known, has already begun negotiations with farmers in the Salinas Valley area of California, and other sections of the Southwest, concerning terms for the planting of guayule.

Increased shipments of guayule from Mexico are also anticipated in the next few years. In 1940 Mexico exported some 5,000 tons of guayule and stepped that up to approximately 7,000 tons last year. The Department of Economy is currently considering a plan advanced by former president Abelardo Rodriguez for expanding guayule cultivation which calls for government subsidies to both cultivators and processors. Processing plants in Mexico are currently located at Torreon, Cedros and Catorce.

Office of Price Administration Sets Ceiling Prices on Scrap Rubber

Maximum prices at which principal grades of scrap rubber may be sold to consumers, except for repair, reconditioning or the manufacture of tire repair materials, were established in Price Schedule No. 87, issued by the Office of Price Administration on February 4. Prices for automobile and truck tire scrap are fixed at seven reclaiming centers—Akron, Buffalo, East St. Louis, Gadsden, Los Angeles, Memphis and Naugatuck—with appropriate geographical differentials. Akron prices for mixed passenger tire scrap and beadless tire scrap are set at $18.00 and $24.00 per ton, respectively.

Prices for specialty grade tire scrap, including peelings, and inner tube scrap are uniform for the area east of the Rocky Mountains, with a lower level set for the Los Angeles area. Red inner tube stock will sell at 7½ cents a pound east of the Rockies and 7 cents in Los Angeles. Premiums are allowed in certain specific instances.

The official price order contains provisions for the maintenance of records, filing of reports, penalties for evasion, method of enforcement, etc. Each grade of scrap covered in the order is given a specific definition. For any scrap rubber consisting of mixed or beadless tires on which the actual transportation charges paid for the direct shipment to a consuming mill (reclaimer) exceed $8.00 per ton, the maximum prices specified in the order may be increased by a sum per ton in excess of the difference between $8.00 and the actual transportation cost per ton involved. This provision was incorporated to give added incentive to the collection and shipment of scrap rubber in areas remote from reclaiming points.

In the meantime activities designed to increase the collection of scrap materials of all kind, including rubber, were afoot throughout the country. Industrial salvage committees were appointed in most municipal areas. One such committee organized in New York City is headed by Clarence H. Low, formerly connected with the U. S. Rubber Reclaiming Co. in an executive capacity. The committee organized in Akron has Robert Iredell, chief engineer of General Tire, as chairman.

A list of minimum prices to be paid by junk men was released by the civilian defense office of the New York Police Department. The following prices, per 100 pounds, were specified for rubber scrap: tires, 40 to 45c; drug sundries, $1.00; garden hose, 25c; heels, 50c; overshoes, 75c; bathing shoes, bathing caps and athletic shoes, $2.00; tubes, $5.00.

Appeals for nationwide campaigns for the collection of every ounce of scrap rubber possible were made last month by J. P. Seiberling, president of the Seiberling Rubber Co., and J. J. Newman, vice-president of the B. F. Goodrich Co. Both stressed the necessity of building as large a supply of scrap for reclaiming as possible.

Reclaim Price Amended

Reclaimers, fully aware of the burden placed upon them by the new rubber restriction regulations, are continuing their efforts to increase reclaiming capacity. An amendment to Price Schedule No. 56 on Reclaimed Rubber, issued by the O.P.A. on February 3, fixed a uniform price ceiling of 12c per pound on red tube reclaim having a specific gravity of 1.15 to 1.32, delivered in carload lots at consumers' plants. The same amendment permitted the discontinuance of cash discounts in the sale of reclaimed rubber. The amendment was necessary in view of the fact that the original price ceilings were applied just about the time reclaimers were concluding contracts for deliveries for the first quarter of the current year and some of these contracts had to be recalled or amended.

Publication of the latest regulations on the consumption of rubber led to immediate speculation as to how many products formerly made completely of crude rubber could henceforth be made of reclaim. A number of such products are mentioned elsewhere in this issue. The B. F. Goodrich Company has already announced a line of Victory V-belts made entirely of reclaim which will give 80% of customary service. In 1941, 2,325,000 pounds of crude rubber went into replacement V-belts for automobiles and 2,260,000 pounds into replacements for domestic appliances.

Amendments Are Issued on Tire and Tube Rationing Program

The tire and tube situation is in approximately the same situation it was a month ago, although several amendments to the original rationing order have been issued to alleviate certain hardships which were found to be affecting the industry too greatly. As was to be expected, the tire ration program has resulted in a big swing toward retreading and recapping with the result that chaotic conditions within that field have resulted, with most retreading shops practically swamped with work. Difficulties of securing camelback have added to the confusion.

In an effort to alleviate this situation the War Production Board is working out a method of distributing tire retreading and recapping machinery, equitable to the entire country, and pending the adoption of such a method asked eleven manufacturers of this type of equipment on February 1 to immediately cease filling any orders except those supported by preference rating certificates. The order, issued by telegram, also asked these manufacturers to list orders that are complete and ready for shipment, those that are partially complete, and those on which work has not yet begun. A formal order putting into effect a distribution system designed to assure all localities of adequate equipment is expected shortly. Further regulations on recapping are also expected.

Amendments to the tire ration order (No. M-15-c) issued since publication of our last issue included the following provisions:

(1) Tire dealers, distributors and wholesalers who are overstocked with new tires and tubes or who wish to liquidate their inventories may now sell them back to their suppliers at prices "which permit them to recover their investment." They may also replenish their stocks by presenting certificates and receipts obtained from the sale of new tires and tubes to "eligible" purchasers. Any citizen may sell a new tire in his possession to a dealer.

(2) The sale of new tires or tubes to foreign governments under the terms of the Lend-Lease Act can be made only under quotas, allocations or other restrictions that may be established from time to time. This provision removes exemptions previously accorded to any person holding an A-3 or higher preference rating issued on a PD-3 certificate. Holders of preference ratings will now have to apply to local rationing boards and will be subject to the same procedure.

(3) "Eligible" users of light truck size tires now can buy any ply tire if they can obtain the required certificate from their rationing board. Formerly, only four-ply tires could be purchased by operators of such trucks. Obsolete size tires, previously under moderate restrictions only, are now subject to the full restrictions of the rationing program and their sale is limited to "eligible" users only. The list of such users is, however, expected to be increased.

(4) The word "truck" has been redefined to mean "any vehicle designed for use on the highways to carry freight, including raw materials, semi-finished goods and finished products, farm products and foods." This means that tires used on vehicles in industrial plants do not fall under the rationing program since such tires can not be used on the highways.

Other factors of interest in connection with the tire and tube situation included the following:

(a) Plans are being worked out to provide truck and bus fleet operators with emergency ration certificates so that essential long-haul trucks and buses will be able to replace blown tires and tubes on the road without undue delay. This plan will not broaden the existing eligibility list nor will national quotas be raised.

(b) A nation-wide inspection of stocks and records of dealers in new tires and tubes is under way in order to determine the extent of violation of the tire rationing regulations. First attention is being given to dealers against whom complaints have been received.

(c) The Reconstruction Finance Corp. and the Office of Price Administration are jointly working out plans designed to finance the orderly carrying and marketing of tires and tubes under the rationing program.

(d) The War Department is planning to establish ten field shops capable of recapping well over 1,000,000 tires annually. Facilities for retreading and repairing tires will also be installed.

(e) The maximum retail price schedule for new tires and tubes has been amended to provide special treatment for certain manufacturers and distributors whose situation differs from the general run of tire producers.

Decisions and Actions of Specific Interest to the Rubber Industry

Other decisions and actions in the war effort of direct interest to the rubber manufacturing industry which have occurred in the past month included the following:

(1) The nation's entire capacity for the manufacture of cotton duck is to be devoted exclusively to fill military requirements. Telegrams were sent to all mills, dealers and jobbers on January 15 directing them to accept no contracts for the manufacture of cotton duck except contracts bearing preference ratings of A-1-j or better. Cotton duck is essential in the manufacture of tents, leggings, canteen bags, tarpaulins, etc. Mills formerly making cotton cord fabric for tire use are expected to start production on cotton duck. Two or three in the South have already started such production.

(2) A plan has been worked out under which the Defense Supplies Corp. will buy up to 200,000,000 yards of osnaburg promptly to be used as a stockpile for use where and when needed. Osnaburg, a cotton fabric similar to burlap, which finds some use in the rubber industry, can be used for sand bags, food packs, packaging, camouflage, and other purposes essential to the war effort. The plan was announced by Frank Walton, chief of the textile and fiber section of the W.P.B. on January 28.

(3) Maximum prices for carbon tetrachloride have been established in Price Schedule No. 79, issued by the O.P.A. on January 29. The prices cover four zones, following the practices of the industry, and range from 73c per gallon, for carload lots in 50-55 gallon drums, for Zone 1 to 94c for Zone 3. Differentials are also established to cover carloads in 5 and 10 gallon cans and for less than carload lots in both size containers.

(4) The zinc oxide pool for the month of February was doubled, from 10 to 20% of total production, in an executive order issued by the Director of Industry Operations of the W.P.B. on February 2. The order specifically requires producers of zinc oxide to set aside an amount equal to 20% of the November, 1941, production of lead free zinc oxide, American and French process, for government allocation.

(5) A maximum price of 4¼c per pound for the normal grade of lithopone is established in Price Schedule No. 80, issued by the O.P.A. on January 29, effective February 2. That price covers carload lots delivered in eastern territory. A price of 4½c per pound was applied on less than carload lots. Six grades of lithopone are covered by the order, with zinc sulphide set at 8¼c per pound in carload lots and 8½c in lesser amounts.

(6) Maximum prices for titanium pigments were established in Price Schedule No. 98, issued by the O.P.A. on February 6, effective March 1. Prices established are those prevailing on October 1, 1941, and continued to date as a result of a request made early this year by the O.P.A. to the five producers of these pigments. The price schedule was put into effect to avert threatened increases in prices due to the increased demands for the pigments as a result of the war effort.

(7) New machine tools, defined as "all machines for the cutting, abrading, shaping and forming of metals" have been brought under a price ceiling at the levels of October 1, 1941, it was announced by the O.P.A. on January 21. Lathes, planers and milling machines are covered by the order, as are metal-working machines of all kinds.

AUTOMOTIVE RUBBER COMMITTEE DISCUSSES HARDNESS TESTING

At a well-attended meeting of Technical Committee A on Automotive Rubber, a joint committe of the American Society for Testing Materials and the Society of Automotive Engineers, held in Detroit early in December, two very significant subjects were thoroughly discussed, *i.e.*, the standardization of hardness testing instruments and the main topic for which the meeting had been called—conservation of rubber by means of restriction of specifications.

Plan Durometer Standardization

Because the committee experienced difficulty, due to the present emergency situation, in the development of proposed hardness testing instruments, it has been decided to publish detailed methods for standardizing the operation of the Shore Durometer in order that the instrument can be used with the best possible results, and that at the same time there be prepared a conversion chart of Durometer readings to A.S.T.M. readings.

The committee also decided to standardize ten of the Durometer instruments, the chairman to select from companies desiring standardized instruments those ten which would give the best opportunity for checking the unstandardized equipment. Each such Durometer will be reserved as a master instrument for checking.

It was the general consensus of the meeting that as an aid in conservation by means of restriction of specifications the number of requirements could be very largely reduced so as to simplify the rubber compounding problem. Following suggestions that rubber stock requirements be set up to cover the range of properties needed, and that bumper and grommet compounds be standardized at once, definite action was taken that such specifications should not include the general use of specific gravity requirements; that Shore Elastometer readings be eliminated; that all ash requirements be eliminated; and that color should not be made mandatory.

McCortney Heads Committee

The committee appointed to carry out the work on this project is headed by W. J. McCortney, Chrysler Corp., and includes eight other members and several alternates. At the meeting Mr. McCortney was selected as vice-chairman of Technical Committee A to assist Mr. L. A. Danse in carrying on the administrative duties of the committee, this action being taken because of pressure on the chairman and the refusal of the committee to accept his resignation.

A special subcommittee was appointed to push the standardization of specifications for synthetic compounds with J. H. Doering, Ford Motor Co., designated as chairman. J. D. Morron, United States Rubber Co., secretary of the technical committee, assisted Mr. Danse with the December meeting.

Coming Events

Feb. 27. Buffalo Rubber Group, Hotel Westbrook, Buffalo, N. Y.

Mar. 2-6. A.S.T.M., Spring Meeting, Hotel Cleveland, Cleveland, Ohio.

Mar. 3. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.

Mar. 17-18. National Ass'n of Waste Material Dealers, Hotel Astor, New York City.

Mar. 20. New York Rubber Group, Building Trades Club, N. Y. C.

Mar. 23-25. A.S.M.E., Spring Meeting, Houston, Texas.

Apr. 20-24. 103rd Meeting, A.C.S., Memphis, Tenn.

May 1. Joint Meeting of Buffalo and Canadian Rubber Groups, Niagara Falls, Ontario, Canada.

May 2. Chicago Rubber Group, Congress Hotel, Chicago, Ill.

May 11-13. American Institute of Chemical Engineers, Boston, Mass.

Sept. 7-11. 104th Meeting, A.C.S., Buffalo, N. Y. Rubber Division Headquarters: Hotel Lafayette.

Reverse Decision in Carbon Suit

The United States Circuit Court of Appeals for the Fourth Circuit handed down a decision on January 6 in the case of the Binney & Smith Co. vs. the United Carbon Co. holding that the Wiegand-Venuto patent (No. 1,889,429) covering the pellet form of carbon black was "valid and infringed by the product of the defendants." The decision thus reverses that handed down in February, 1941, by the Federal Court at Charleston, West Virginia, which held that "there were recognizable differences in porosity, purity and uniformity between the pellet black sold by both plaintiff and defendant" and that the patent involved "does not require the exercise of inventive faculty and is lacking in novelty." The Appellate Court, however, held that the patent is a "pioneer patent as applied to the particular art, and its claims are entitled to a liberal construction." Only the claims of the Wiegand-Venuto patent are involved in the suit. The United Carbon Co. is expected to appeal the latest decision to the Supreme Court.

U. S. Rubber Buys Yarn Mill

The purchase of the Hogansville plant of the Callaway Mills at Hogansville, Ga., has been announced by the U. S. Rubber Co. Acquirement of the plant and its equipment will enable the company to make substantially all of its own duck for belting, hose and other mechanical goods. The mill, which is adjacent to the company's tire cord mills, employs 400 at present.

MANUFACTURERS' ASSOCIATION DISCUSSES CONTACT METHODS

The possibility of setting up some type of group contact method with local priority officials was the principal subject of debate at a meeting of the California Rubber Manufacturers Association, held at the Jonathan Club in Los Angeles on February 5. A committee of five was appointed to contact the various members of the association to determine their thoughts in this direction. Charles N. Merralls, president of the Rubbercraft Corporation of California, and president of the association, presided at the meeting.

The matter of a full-time paid secretary through whom the manufacturers may operate, particularly in the matter of securing detailed interpretations of priority instructions, is also under advisement, as is the substitute possibility of appointing some member of the association to do a similar job on a part-time basis. The result of the committee's investigation along these lines will be given at a meeting to be held as soon as practical.

Thirty-five men, more than half of them executives or owners of rubber manufacturing plants in California, attended the meeting. Present also were two representatives of government agencies, as well as a representative of the Merchants and Manufacturers Association of Los Angeles. The spirit of all-out cooperation was manifest at the meeting.

The California Rubber Manufacturers Association has been in existence for a number of years, although meetings are not held regularly, but rather when major problems of the industry arise, as at present. In addition to Mr. Merralls, officers include T. Kirk Hill, president of the Kirkhill Rubber Co., as vice-president, and J. C. Ballagh, head of the Patterson-Ballagh Corp., as secretary.

Ralph LaPorte Promoted

Ralph LaPorte, chief chemist of the Seiberling Rubber Co., for the past eight years, has been named manager of production of the company's expanded mechanical goods department, it was announced by H. P. Schrank, vice-president in charge of production, on February 6. Mr. LaPorte will be responsible for development and production of all items other than tires and tubes. A. A. Leedy continues as production superintendent of the tire division.

End Trading in Rubber

Trading in rubber futures was suspended on the Commodity Exchange as of the close of business on February 6. A committee has been appointed to determine terms for the liquidation of open contracts. Very few transactions in crude rubber contracts have occurred since the price of rubber was fixed at 22½ cents by the Rubber Reserve Company on August 7.

NAMES IN THE NEWS

F. A. Bonstedt, for many years a special representative of the Binney & Smith Co., located at the Akron office, has been transferred to the New York offices at 41 East 42nd Street. He will visit the trade as usual.

Peter A. Chance, associated with the General Motors Corporation for many years, has been appointed general manager of the Brake Lining Manufacturers' Association, Inc. The Association maintains headquarters at 370 Lexington Avenue in New York City.

John H. Balch, secretary and comptroller of the Union Asbestos & Rubber Co., Chicago, was recently elected to the board of directors of that company, succeeding the late William R. Gillies.

John R. Hoover, associated with the B. F. Goodrich Co. since 1925, has been appointed manager of the synthetic sales division of that company, succeeding Dr. Howard E. Fritz who was recently made director of research.

F. B. Davis, Jr., president and chairman of the board of the U. S. Rubber Co., resigned as a director of E. I. du Pont de Nemours & Co., Inc., on January 19. He was succeeded by Lamont DuPont Copeland, who has seen active service with the Rubber Chemicals Department of the company.

Leonard K. Firestone, president of the Firestone Aviation Products Co., and Raymond C. Firestone, president of the Firestone Tire & Rubber Co. of Tennessee, have both applied for active war duty, the former in the Naval Reserve and the latter in the Army.

Ernest Bridgwater, manager, Rubber Chemicals Department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., addressed the annual meeting of the Franklin Institute in Philadelphia on January 21. He discussed synthetic rubber under wartime emergency.

Norman A. Ruston, formerly chemical sales manager for Emery Industries, Inc., Cincinnati, Ohio, has been promoted to general sales manager of that company. Clifford W. Sampson has taken Mr. Ruston's place as chemical sales manager.

William T. Baird, Jr., president of the Baird Rubber & Trading Co., and Joseph Louis, president and treasurer of Littlejohn & Co., were elected governors of the Commodity Exchange, Inc., to represent the rubber group, at the annual election of the Exchange held on January 20.

M. E. Lerner, Editor of Rubber Age, was appointed a member of the General Committee of the Sub-Division on Rubber & Plastics of the American Society of Mechanical Engineers last month. The function of the Committee is to keep the officers of the sub-division advised on matters of special interest.

Dr. C. F. Rassweiler, director of research of the Johns-Manville Corp., was elected a vice-president of that corporation last month. He joined the concern last June.

W. Gleed "Bill" Coe, former production manager of Rubber Age, and associated with the Fisk Tire Division of U. S. Rubber at Springfield, Mass., for the past year, is now in Washington as an Associate Industrial Specialist in the Planning & Control Division of the Quartermaster Corps of the Army.

Cyrus Ching, director of industrial and publication relations, U. S. Rubber Co., has been appointed an associate member of the War Labor Board representing management. S. H. Dalrymple, president of the United Rubber Workers of America, was appointed to represent labor.

D. C. McRoberts, until recently associated with the Gates Rubber Co. as technical director, has joined the Johns-Manville Corp. as superintendent of the packing division at the Waukegan, Ill., plant. He succeeds George H. Ellinwood who has retired. Mr. McRoberts at one time was editor of the *India Rubber World* and before that was associated with U. S. Rubber for many years.

Allen M. Varney, associated with the Boston Woven Hose & Rubber Co. for the past several years, was recently named chief chemist of the La Crosse Rubber Mills Co., La Crosse, Wisconsin. J. J. Liskovec continues as assistant superintendent of that plant.

Harold A. Brittain, general superintendent of the Goodyear plant at Wolverhampton, England, is currently in this country on an extended visit. He can be reached at the Akron plant.

Wilson H. Hunter, aeronautical research engineer of the B. F. Goodrich Co., has been appointed a member of a special committee of the National Advisory Committee for Aeronautics to study ice problems in aviation. Dr. W. C. Geer, retired Goodrich research executive, is a member of the same committee.

Changes at Goodrich

The mechanical goods and sundries sales divisions of the B. F. Goodrich Co. have been combined and are now handled jointly by the Industrial Products Sales Division, it has been announced by W. S. Richardson, division general manager. The organization set-up under the new policy is as follows:

B. F. Stauffer, division assistant general manager in charge of Miller plant activities; L. H. Chenoweth, manager, manufacturers' sales; C. F. Conner, manager, distributor sales; C. O. Delong, manager, operations, and the following department managers:

P. W. Van Orden, hose and belting; J. F. Johnston, molded, extruded, sponge, Anode dipped goods; G. K. Ryan, rubber and latex thread, golf ball products; H. C. Klein, rubber lined and covered equipment; F. A. Lang, shoe products sales; J. M. Failey, printing rubber, printing rolls, printing blankets, platens, packings, floor coverings, lathe cut goods; H. A. Bauman, bands, drug, hospital and surgical products.

Paul C. Mathewson, formerly associated with the Armstrong Rubber Co. in an executive capacity, has been appointed factory superintendent of the Pennsylvania Rubber Co., Jeannette, Pa. Roderick B. Cave, formerly associated with the Electric Auto-Lite Co., has been named sales manager of the company, succeeding L. J. Waldron, resigned.

Webster N. Jones, director of the College of Engineering, Carnegie Institute of Technology, will receive the 1941 Award of the Pittsburgh Section, A.C.S., at a dinner meeting to be held on February 19 at the University Club in Pittsburgh.

Thomas Midgley, Jr., has been awarded the Willard Gibbs Medal for 1941 by the Chicago Section of the A.C.S. The medal, awarded to Dr. Midgley for his numerous scientific achievements, including his contributions to the knowledge of the chemistry of rubber and methods of synthesizing rubber, will be formally presented on May 22.

D. E. Cable, technical librarian, General Laboratories, U. S. Rubber Co., Passaic, N. J., passed out the cigars early this month, the occasion being the birth of Ellen Saunders Cable on February 5. The new arrival weighed 5¼ pounds. Mrs. Cable was reported doing well.

Elmer R. White, formerly audit report analyst for the Rural Electrification Administration, and who previously was with the War Department as an auditor examining World War contracts with rubber manufacturing companies, has joined the Rubber Section of the O.P.A.

New York Meets on March 20

The next meeting of the New York Group, Rubber Division, A.C.S., will be held at the Building Trades Club in New York City on Friday, March 20. As usual, the meeting will get under way at 4:30 P.M. and will be followed by dinner. Although the program has not been definitely set at this writing it will include at least one paper on the reclaiming of rubber and a film depicting the manufacture of reclaim. At a meeting of the group's executive committee, held in New York on February 4, it was decided to again hold the Prize Paper Contest, full details of which will appear in an early issue. The committee was undecided as to whether or not to hold the usual outing this year because of present conditions and finally decided to put it up to a vote at the March 20th meeting. Reservations for the meeting should be made with Peter P. Pinto, secretary-treasurer, c/o THE RUBBER AGE, 250 West 57th Street, New York City.

Chicago Group Hears Somerville

Dr. A. A. Somerville, head of the rubber department of the R. T. Vanderbilt Company of New York City was the principal speaker at the meeting of the Chicago Group, Rubber Division, A.C.S., held at the Congress Hotel in Chicago on February 5. Dr. Somerville discussed "Weather Aging" and reported results achieved in the Vanderbilt laboratories on a series of tests conducted over a period of years. Following the presentation of this paper a motion picture, "The Eyes of the Navy", was shown by Ensign W. J. Gillerlain of the Chicago Office of the U. S. Navy. The film described in detail the training of a civilian from tyro to a full-fledged flying cadet. The next meeting of the group will be held at the Congress Hotel on May 2, and will feature an interesting presentation by the Monsanto Chemical Co.

Carbon Black Sales Set Record

As a result of the record consumption of crude rubber in 1941, shipments of carbon black also registered a new high in the same year, according to preliminary figures issued by the Bureau of Mines. Sales of carbon black in 1941 amounted to approximately 543,000,000 pounds, which compares with 457,000,000 pounds sold in the preceding year. The rubber industry normally takes about 85% of all carbon black sold, and about 75% of this amount is consumed in tires and tubes.

Triangle Moves to New Brunswick

Triangle Conduit & Cable Company has moved into its new factory at New Brunswick, N. J., The previous factory had been located at Glendale, L. I., N. Y., for several years. Larry D. Walker, chief chemist of the company for the past few years, has left the company's employ.

Washington Appointments

Dr. Clarence A. McGregor, head of the department of commerce and industry at Cleveland College, has been named chief of the classification unit of the Rubber Section of the O.P.A. Ben Lewis is chief of the section.

Dr. Warren W. Leigh, professor of marketing at the University of Akron, is now head of the tire and tube price unit of the Rubber Section, O.P.A. He has been serving as a price consultant with the O.P.A. for some time but has now been granted a leave of absence by the university and will be located in Washington.

Arthur W. Carpenter, manager of testing laboratories for the B. F. Goodrich Co., has been "loaned" to the government and is serving as a member of the staff of the Conservation and Substitution Branch of the Bureau of Industrial Conservation of the War Production Board.

Smith M. Johnson, president of the Johnson Rubber Co., has joined the staff of the Rubber & Rubber Products Branch of the W.P.B. He volunteered his services for the duration.

T. Spencer Shore, treasurer of the General Tire & Rubber Co., has been appointed chief of the Bureau of Industry Advisory Committees of the W.P.B. He succeeds Sidney Weinberg who has been named an assistant to Donald Nelson.

H. P. Protheroe, manager of the mechanical goods compound division of the Goodyear Tire & Rubber Co., has been "loaned" to the War Production Board to aid in the rubber conservation program. He is the second Goodyear executive to take a $1-a-year job with the W.P.B.

Willis C. Behoteguy, formerly assistant merchandising manager of the tire sales division of Goodrich is now associated with the Rubber Section of the O.P.A. and is engaged in studying requests for tires from non-eligible car owners. He is being assisted by E. C. Leach, accessories sales manager of General Tire.

J. C. Ray, sales manager of the Fisk Division of U. S. Rubber, is also associated with the O.P.A.'s Rubber Section, engaged in studying the divisional quota schedules set up under the original rationing order. M.H.S. Jones and F. O. Slutz, both associated with Goodrich for many years, are also with the same section.

Arthur Nolan, assistant to the sales manager of the Latex and Lotol Division of Naugatuck Chemical, has joined the War Production Board as an industrial specialist in the technical section of the Rubber and Rubber Products Branch.

J. E. Hutchman, associated with Naugatuck Chemical for the past ten years as divisional sales representative, has joined the W.P.B. as principal industrial specialist of the Rubber, Cork & Asbestos Section of the Division of Civilian Supply.

Haynes Addresses Quebec Group

Charles R. Haynes, of the technical service department of the Binney & Smith Co., discussed "The Manufacture and Uses of Colloidal Blacks in Rubber and Plastics" before the meeting of the Quebec Rubber & Plastics Group, held at McGill University at Montreal, Canada, on February 6. Numerous slides were used to depict the work done by the company with the electron microscope. Mr. Haynes was assisted by John W. Snyder, of the same company, who amplified the former's remarks concerning the theoretical work accomplished to date. At the business meeting the group unanimously approved the recommendation advanced by the executive committee to affiliate with the Montreal Section of the Society of Chemical Industry and will operate in the future as a subject division of that section.

Ontario Group Hears Lorimer

Douglas Lorimer, president of the Canadian Chemical Association, and controller of chemicals for Canada, was the principal speaker at a meeting of the Ontario Rubber Section of the Canadian Chemical Association, held at McMaster University in Hamilton, Ontario, on January 21. The meeting was held jointly with the Hamilton Chemical Association. Taking as his subject "War Time Control of Chemical Products," Mr. Lorimer explained the nature of the chemicals required for wartime use and warned that fewer and fewer allotments would be made for civilian product use. He stressed the point repeatedly that war demands are placed before anything else.

Buffalo Meets on February 27

The first meeting of the 1942 season of the Buffalo Group, Rubber Division, A.C.S., will be held at the Hotel Westbrook in Buffalo on Friday evening, February 27. Dr. William B. Wiegand, director of research for the Columbian Carbon Co., will present a paper on the "Electron Microscope and the Significance of Its Findings Regarding Colloidal Carbon." He will be assisted by William A. Ladd, electron microscope physicist. Reservations may be made with either John S. Plumb, chairman, or H. L. Wiley, secretary-treasurer, both associated with the U. S. Rubber Reclaiming Co., Buffalo, N. Y.

Akron Rubber Group Meets

A meeting of the Akron Group, Rubber Division, A.C.S., was held at the Akron City Club in Akron, Ohio, on Friday, January 30. Three sound motion pictures in beautiful color were presented, all three expounding the social and industrial advantages of the State of Ohio. The films were shown through the courtesy of the Standard Oil Company of Ohio. Entertainment was furnished by "The Rhythm Maids."

NEWS IN BRIEF

Naugatuck Aromatics, a division of the U.S. Rubber Co., which handles the sale and distribution of the aromatic products of the Naugatuck Chemical Division, has moved to new headquarters at 254 Fourth Avenue, New York City. M. G. Couderchet is manager of the division.

An interesting booklet prepared for the American taxpayer to assist him in making out his 1941 income tax return has been made available under the name of the "A.B.C. of Income Tax Returns" by the General Atlas Carbon Division of General Properties Co., Inc., 60 Wall St., New York City. Copies are free on request.

The fire that destroyed thousands of tons of crude rubber at the plant of the Firestone Rubber & Latex Products Co. in Fall River, Mass., last October has been attributed to spontaneous ignition in an official report, released by State Fire Marshall Stephen Garrity in Boston.

This Chemical Age, a new book by Williams Haynes, published by Alfred A. Knopf, publishers, of New York City, devoted to "the miracle of man-made materials," contains some interesting data on the growth of the synthetic rubber industry in the United States.

The Mathieson Alkali Works, Inc., manufacturer of caustic soda and other chemicals used in the rubber and other industries, is currently observing its fiftieth anniversary. The company, which has headquarters in New York City, operates plants in Saltville, Va., Niagara Falls, N. Y., and Lake Charles, La.

Several months ago the New Jersey Zinc Co., 160 Front St., New York City, issued a folder entitled "Zinc in Defense." With the entrance of the United States into the war a new pamphlet, "Zinc in War," was prepared, this pamphlet taking on new significance. The new pamphlet, copies of which are available on request to the company, shows the diversified activities of zinc.

The Footwear Division of U. S. Rubber has announced that it will feature a line of quality athletic socks during 1942. The socks are designed for wear with Keds as well as for other types of athletic shoes. Five styles for men and one for boys and women are included in the line.

The 1942 Market Guide for Latin America, the 20th revised edition, has been issued by the American Foreign Credit Underwriters Corp., 84 William St., New York City. The guide lists and rates some 55,000 leading importers, manufacturers, distributors and sales agents throughout Latin America.

The Printing Materials Division of the Bakelite Corp., which handles plastic printing plate products among others and which was formerly located in Bloomfield, N. J., has been moved to 300 Madison Ave., New York City.

A booklet on bowling, entitled "Strikes and Spares," in which is contained some helpful bowling hints as well as space for maintaining a full season's record, is now being distributed to its trade by the General Atlas Carbon Division, 60 Wall St., New York City. Copies are free for the asking.

Forty-four waste and scrap materials, including rubber, are being quoted at prices averaging 65½% over those prevailing at the outbreak of the European war, according to a study recently completed by the Bureau of Labor Statistics. Weekly changes since January 7, 1939, were covered in the study.

Reprints of the article on the cultivation of guayule, which was published in the October and November, 1941, issues of the *India Rubber World*, have been made available by the Intercontinental Rubber Co. Copies are available without cost on request to the company at 745 Fifth Ave., New York.

Imports of crude rubber into the United States during the month of October amounted to 72,222 long tons. The average declared valued was 19.5c per pound as compared with 18.75c per pound for September imports. Government stocks at the end of October amounted to 265,738 tons.

Searle Aero Industries, Inc., Hawthorne, Calif., announces that Amerflex, its new flexible electrical conduit which is used in aircraft wiring systems, is now available with a synthetic rubber casing. In this type, Amerflex will outlast ordinary conduit by 30 to 40%, according to the company, and is 54% lighter in weight.

A nation-wide contest for industry, providing for fourteen cash awards, has been announced by the Compressed Air Institute, East Orange, N. J. The subject matter is unlimited other than that it be concerned with some use or phase of compressed air. Details may be secured direct from the Institute.

Late News Flash

Just as this issue went to press word was received from Washington that the War Production Board has issued an order outlining specifications limiting the percentages of crude rubber which may be used in compounds for the manufacture of a long list of essential rubber products. Included were tires and tubes which hereafter will contain approximately 15% less crude rubber than before. The order is intended to save upwards of 25,000 tons of crude rubber annually and was expected by the industry.

The compounding specifications, drafted by the technical section of the Rubber & Rubber Products Branch, constitutes the first step in a program to regulate the consumption of crude rubber in all rubber products. The present order covers hose and tubes; conveyor, elevator and flat-transmission belts; occupational and protective clothing; jar rings; tennis and gymnasium shoes; waterprof boots; arctics, gaiters and overshoes; tires, casings, tubes and retreading materials (principally camelback); bicycle tires; fire hose and mill hose; and tires and tubes to fill designated war orders.

An example of the drastic revision made in manufacturing practices as a result of the order is found in the footwear field. Producers of rubber boots and overshoes must confine their production to black types only and must cut the amount of crude rubber used in such products by 33⅓% or more. Manufacturers of bicycle tires are forbidden to use more than 7½ ounces of crude rubber per tire. Full details of the order will appear in the next issue.

At the same time it was learned that the Office of Price Administration issued an order putting recapped and retreaded tires under practically the same rationing regulations which currently apply to new tires and tubes. Two eligibility lists have been created which closely duplicate those involved in the new tire and tube regulations. After February 19 retreaded and recapped tires can be secured only by persons holding certificates entitling them to the purchase of such tires.

Form New Danbury Company

Danbury Rubber Co., Inc., has been organized at Danbury, Conn., and has taken over the assets of the former company of the same name. Officers of the new company include John E. Ryan, president and treasurer, and Fred T. Roberts, vice-president. Both men have had extensive experience in the rubber industry, the former largely in France. Rubber tile and mechanical specialties will be made, with expansion to other fields planned when regulations concerning rubber consumption are lifted. Additional manufacturing space will be provided as soon as convenient.

FINANCIAL NEWS

PROFIT OF $13,662,658 REPORTED BY U. S. RUBBER

Net earnings of the United States Rubber Co. for the year of 1941, after all taxes and charges, totalled $13,662,658, equal to $4.68 a share on 1,739,092 shares of common stock outstanding after preferred dividends. This compares with $11,425,241, or $3.58 a share, reported for the previous year. Consolidated net sales amounted to $315,345,328, largest in the company's history and 38% higher than those of 1940. Previous high sales were $256,150,130 reported in 1920.

Profit from operations in 1941 amounted to $34,756,575, compared with $19,409,532 in 1940, and the net income before provisions for taxes and adjustments totalled $34,047,216, compared with $18,496,383. Federal and foreign income and excess profits taxes amounted to $18,896,044, or almost three times the $6,534,593 paid in the preceding year.

Current assets at the year-end amounted to $154,814,838, of which $29,135,931 was cash and $9,179,040 treasury tax anticipation notes, and current liabilities were $66,464,919, resulting in net working capital of $88,349,919, an increase of $5,804,647 for the year. Sinking fund redemptions during the year of $3,120,000 reduced net outstanding funded indebtedness from $41,067,000 to $37,947,000. The First Mortgage and Collateral Trust 3½% bonds held by the insurance fund trustees were retired during the year. Sinking fund redemptions during 1942 will amount to approximately $3,384,000.

Inventories totalled $76,665,648, an increase of approximately $12,000,000, with raw materials and supplies accounting primarily for the gain. Finished goods were about $2,600,000 less, while goods in process of manufacture were up $1,300,000. Net book value of properties, plants and equipment at the year-end was listed at $66,953,298. Total capital additions during 1941 amounted to $7,572,104, depreciation to $8,649,919, and disposals and adjustments to $1,067,860.

Payrolls reached new highs during the year, a total of $87,833,133 being paid in wages and salaries to an average of 49,519 employees, not including some 23,000 on the plantations. The number of employees, excluding those on the plantations, increased 18% over the previous year. Wages increased 45% and salaries 18%.

Spread of war to the rubber growing lands of the Far East, and its effect on the company, which is the world's largest producer of rubber, was reflected throughout the report. A sum of $1,400,000 was charged against earnings for estimated war losses which may have occurred on the company's plantations in Malaya, and in export operations in the Philippines and elsewhere in the Far East.

According to a statement accompanying the report, approximately 21,000 acres of the U. S. Rubber plantations in Malaya have been overrun by the invaders but no word as yet has been received with respect to any damage. The company has approximately 30,000 acres in Malaya and 101,000 in Sumatra, a grand total of 131,000 acres. Of these, 102,000 acres have been planted and 88,000 acres are mature. Production figures, based on reports for a full year from Sumatra and ten months from Malaya, indicate that 57,000,000 pounds of rubber were shipped to the company or sold in 1941. This quantity, about 8,000,000 pounds less than that shipped during 1940, was approximately 15% of the company's requirements last year.

Net income derived from the plantations during the year was $2,629,160 before provision for estimated war losses, or less than 8% of the company's total earnings. Approximately $1,600,000 of this amount was received in the United States during the year. The plantations properties, plants and equipment are carried at $36,993,290, with reserves for depreciation and amortization of $18,120,284, leaving net valuation of $18,873,006.

With regard to domestic operations, the statement indicates that factories operated at capacity until restrictions on the consumption of rubber were applied. Reference is also made to the entrance of the company into the munitions business, expansion of facilities for producing reclaimed rubber, and the construction of a synthetic rubber plant for the Government at Naugatuck, Conn.

Baldwin Rubber Company

Fourth Quarter: Net income of $77,257, equal to 25c each on 315,254 shares of common stock, which compares with $208,586, or 66c a share, in the corresponding period of 1940. For the six months ended December 31, 1941, the company reports net income of $178,324, equal to 57c a share, compared with $290,062, or 92c a share, for the last six months of 1940.

New Jersey Zinc Co.

For 1941: Net income of $9,592,871, equal to $4.88 a share, which compares with $8,236,815, or $4.19 a share, in 1940. In the final quarter of 1941 the company had a net income of $2,559,481, or $1.30 a share, against $2,519,490, or $1.28 a share, in the preceding quarter, and $3,122,351, or $1.59 a share, in the fourth quarter of 1940.

GENERAL TIRE & RUBBER CO. SHOWS PROFIT OF $1,218,569

Net profit of the General Tire & Rubber Co. for the year ended November 30, 1941, amounted to $1,218,569, equal to $2.05 per common share, which compares with $595,916 in 1940, or only 86c a share. Net sales amounted to $37,353,021, 60% greater than those reported for the previous year, and a new high record for the company.

According to a statement by W. O'Neil, president, which accompanied the report, net earnings were cut considerably by setting aside a reserve of $700,000 to cover the switch to the "last-in, first-out" method of inventory pricing. This cut net profit by approximately $245,000. Current assets as of November 30, 1941, amounted to $13,047,651, compared with current liabilities of $3,594,883, a ratio of 3.6 to 1.

The demand for tires for military purposes, Mr. O'Neil stated, had been an important item in sales during the year. Production was expanded for the manufacture of tires for airplanes, combat cars, prime movers, bomb trailers, convoys, pontoon trailers, and other military vehicles. In reporting on other phases of the company's activities during the year, Mr. O'Neil made mention of the new Akron barrage balloon plant, and the expanded manufacture in the Wabash, Indiana, plant of gas masks, radio antennae, and other molded goods. He also referred to the new munitions plant now under construction in Flora, Miss., which General Tire will operate for the government.

EARNINGS OF GOODYEAR TIRE LARGEST IN FIRM'S HISTORY

Consolidated net profit of the Goodyear Tire & Rubber Co., for the year of 1941 amounted to $12,831,397, after depreciation, interest, subsidiary dividends, Federal and foreign income and excess profits taxes, and $7,000,000 provision for contingencies. Earnings were the highest in the company's history and were based on net sales of $330,599,674. A net profit of $10,309,788, based on net sales of $217,540,079, was reported for the previous year.

After allowing for dividend requirements on the $5.00 preferred stock, the 1941 profit is equal to $4.68 a share on 2,059,168 shares of common stock, excluding 2,288 shares in the treasury, which compares with $3.44 a common share after provision of $1,000,000 for contingencies in the year of 1940. The 1941 provision for Federal and foreign income and excess profits taxes amounted to $26,357,665, as compared with total tax deductions of $6,973,015 in 1940.

Current assets as of December 31, 1941, amounted to $140,199,916 and current liabilities to $34,123,109, compared with $120,313,776 and $22,245,746, respectively, at the close of 1940.

LOS ANGELES NEWS

Emmet S. Long, formerly associated with rubber manufacturing activities in the Los Angeles area, has been appointed general manager of the Golden State Rubber Mills, 651 East 61st Street. L. J. Kraft, who has been acting general manager for the past year, continues as assistant manager.

Mr. Long was one of the founders of the Los Angeles Rubber Group in 1928, at which time he was one of the proprietors of the Long-Turney Corp. In 1930 he went to England and founded Long & Hambly, Ltd., which manufactured rubber appliances. He sold his interest in the latter concern in 1939, shortly after the outbreak of war in Europe. The factory operated by the company is still in operation. Mr. Long, incidentally, is a fellow of the I.R.I.

Don T. Van Zandt is now associated with the engineering department of the Western Insulated Wire Co., 1001 East 62nd Street.

Fred Weimer is the new tennis champion at Goodyear downing all opposition in a recent plant-wide competition.

A. W. Phillips, superintendent of the tire division for Goodrich, whose home is in Akron, spent two weeks in Los Angeles late in January.

L. F. McDonald, treasurer for the Los Angeles Rubber Group, who has been connected with the tire construction design department at Goodrich for several years, has left the employ of that company. He has not announced his future plans.

Hugh Hamilton, personnel manager and purchasing agent for Goodyear-Brazil, who has spent some time visiting old friends and plant associates in Los Angeles, has left for his return trip to South America.

I. D. Blumenthal of Charlotte, N. C., president of the Golden States Rubber Mills, who has been in Los Angeles more than a month, plans at this writing to spend at least another month in this area.

A. B. Johnson, who for some time has been in charge of outside sales production for the Kirkhill Rubber Company, dropped dead in the office of the plant superintendent, Bill Haney, on Tuesday, February 3. Mr. Johnson had just hung up the telephone after talking to T. Kirk Hill when he suddenly fell over and passed away almost instantly. Mr. Hill says his voice seemed strong and there was no sign of illness when he was talking to him. Mr. Johnson was about 45 years old and besides his wife leaves two sons and one daughter.

Experiencing only one lost-time accident during 1941 the Personnel-Engineering-Miscellaneous Division of Goodyear won the Fleming Inter-Department Safety Trophy for the year. Various other departments also made good safety records.

Ed Royal is distributing a very useful advertising folder containing a group of maps both small and large showing in detail the principal war areas. Since this company is interested primarily in supplies for the rubber industry the greater number of maps shows the detail of the East Indian Islands, the Malay area, etc.

The new addition to the Kirkhill Rubber Company's plant on St. Andrews Street is slated for completion shortly. T. Kirk Hill, president, announces that a new reclaiming set-up will be in operation very shortly and that the plants owned by this company are all running six days per week, 24 hours per day. Gross business for 1941 was practically double that of 1940. The number of employees also practically doubled during the year. More than 85 per cent of all goods manufactured now are defense goods.

Attention has again been called to the experiments of William A. Sharpe of Alhambra by a long feature article in the *Los Angeles Times* with pictures of Mr. Sharpe at work in his laboratory. Mr. Sharpe claims to have perfected a valuable rubber latex through a process of milk weed juice fermentation provoked by the introduction of certain bacteria. This is the second sizable article that this newspaper has run.

N.A.W.M.D. Plans Convention

For the second time in its history the National Association of Waste Material Dealers will hold a wartime convention. The convention dates are Tuesday and Wednesday, March 17 and 18, with all meetings to be held in the Hotel Astor, New York City. The annual banquet will be a feature of the two-day meeting. Julius Muehlstein and Nat E. Berzen are among those on the Convention and Banquet Committee.

Bridgwater Machine Co. Expands

Already operating at capacity on war orders, the Bridgwater Machine Co., 68 Cherry St., Akron, has expanded its production facilities by purchasing a two-story brick and frame building at 219 East Miller Ave. The new plant will provide 20,000 square feet of additional floor space.

DUPONT SPONSORS MEETING OF LOS ANGELES RUBBER GROUP

Approximately 145 members and guests attended the monthly supper meeting of the Los Angeles Group, Rubber Division, A.C.S., held at the Mayfair Hotel in Los Angeles on February 3. The program for the evening, following recent practice, was sponsored by E. I. du Pont de Nemours & Co., Inc., through the cooperation of Herman Jordan, local representative.

Two motion pictures were shown, one tracing the manufacture of neoprene from start to finish, the other, "Better Living Through Chemistry," showing the development and use of various DuPont products. Pictures of last summer's fishing trip, sponsored by the group, were shown by Mr. Jordan, as was a news reel by Ed Royal. House numbers made of Lucite were distributed as table souvenirs.

Two door prizes were distributed, one being a $25.00 Defense Bond, won by Mason L. Paine of Firestone, and the other an automobile tire, beautifully wrapped in cellophane, won by Karl W. Faulhaber of the Faulhaber Rubber Co. The latter, however, when unwrapped turned out to be a tire which might have been used by Caesar when crossing the Alps and recapped for Napoleon to aid in his retreat from Moscow. It was a fine example of a demolished tire, consisting largely of major blow-outs and shredded ends, and caused considerable merriment.

Two special prizes were distributed, the first, a traveling bag, presented by C. M. Reinke for the Charles T. Wilson Co., going to Jim Gardner of the J. R. Gardner Co., and the other, a lawn sprinkler, presented by John Hoerger for A. Schrader's Son, to L. F. McDonald, until recently associated with Goodrich, and treasurer of the group. Ten new members were voted in during the evening, bringing the membership total to 232.

The new Year Book of the group, which contains a complete membership roster, as well as lists of rubber manufacturers and suppliers in the Pacific Coast area, largely taken from the 1941 RUBBER RED BOOK, and which is dedicated to Ed Royal, of the H. M. Royal Co., for his "unselfish devotion" to the interests of the group, was distributed at the meeting. The by-laws of the group are also incorporated in the book.

Thermax S Introduced

The R. T. Vanderbilt Co., 230 Park Ave., New York City, has introduced a new type of thermatomic carbon called Thermax S. The new carbon was especially developed for use in the loading and plasticizing of the butadiene type of synthetic rubber. It is said to be fast mixing and dustless and to require little or no additional plasticizer. It is especially recommended by the company for smooth calendering and tubing.

CANADIAN NEWS

Government restrictions on the manufacture of many rubber articles are having a widespread effect upon the rubber industry in the Dominion of Canada.

Practically every company faces a realignment of production schedules, temporary and permanent layoffs, and a reduction in profits. The smaller companies which do not have widely diversified lines but specialize in the smaller molded and extruded items are being especially hard hit. One of the companies in this classification on the outskirts of Toronto has already cut its production by fifty per cent and has reduced its working force materially.

The elimination of passenger tires hits the seven largest companies. While the quantity of rubber formerly consumed in passenger casings will still be used in the production of tires for heavy trucks and combat vehicles, the number of units will be substantially reduced and this will have an undoubted effect on payrolls. Since these tires are nearly all made for the Dominion government, there will be a decrease in the level of profits for the companies involved since war business is usually negotiated on a cost plus five percent basis.

The large tire companies nearly all have extensive mechanical goods divisions which may help take up slack in the idle passenger tire divisions. For example, Goodyear, number one tire producer, is also a leader in the production of heavy mechanical goods. Goodrich, one of the smaller tire companies, is the most important factor in the rubber-lined tank business. Equipped with the largest vulcanizer in the Dominion, the Kitchener firm has all the work it can handle in lining tanks and other equipment for the many new chemical plants and other industrial enterprises currently under construction.

Arthur L. Brown, assistant general sales manager of the Northern Electric Co., Ltd., has been appointed to the Wartime Prices and Trade Board as administrator of electrical equipment. Mr. Brown joined the Northern Electric Company after the last war during which he served with the Imperial Ministry of Munitions in the Inspection Branch.

Albert A. Jansen, who has been manager of tire construction for the B. F. Goodrich Co., Ltd., for the last several years left Kitchener on February 14 to take up new duties with the Canadian government in Ottawa.

Lawrence S. Hawes, general manager of Rubberset Co., Ltd., Gravenhurst, Ontario, has been named director of the brush division under the Furniture Administrator.

According to a recent action of the Dominion government it has been made a criminal offense to burn, cut or destroy any tire or tube. Infractions of the law will be punishable by fines up to $5,000 or five years imprisonment or both.

Imports of crude rubber into Canada in November were markedly under imports for the same month in 1940. November imports amounted to 5,506,997 pounds compared with 9,923,038 for the previous month and 11,311,687 for the same period in 1940. Total imports for the first eleven months of the year amounted to 142,685,655 pounds compared with 97,452,005 for the first eleven months of 1940, an increase of 46.4 per cent.

Paul E. Gnaedinger has been appointed manager of aircraft products in the mechanical rubber goods division of the Dominion Rubber Co., Ltd., Montreal. Mr. Gnaedinger has been connected with the rubber industry in Canada and the United States ever since his graduation from McGill University in 1921. He has served for a number of years in important positions with the Dominion Rubber Company and in recent months had been loaned to Federal Aircraft, Ltd. Mr. Gnaedinger's recent association with the aircraft industry has particularly fitted him for his new position as the Dominion is now producing many rubber parts for airplanes.

Among the contracts in excess of $5,000 granted by the War Supply Board, Ottawa, to Canadian rubber manufacturers during the period November 18 to December 23 were the following: *For land transport*, Goodyear, $188,096; Firestone, $106,291; Dominion, $26,134; Gutta Percha, $18,501. *For clothing*: Viceroy, $186,194; Miner Rubber Co., $93,750; Dominion, $72,603; Canadian General Rubber Co., $66,737; Kaufman, $52,277; Barringham Rubber Co., $52,276; British Rubber Co. of Canada, $33,440; Gutta Percha, $17,600; Acton Rubber Co., $8,800. *For personal equipment*, Dominion, $103,486; Goodrich, $91,089; Viceroy, $33,159; Granby Elastic Web, $9,481. *For aircraft*, Dunlop, $84,036; Dominion, $7,710; Goodrich, $7,710; Goodyear, $5,140; Firestone, $5,140. *For electrical equipment*, Northern Electric, $111,015; Phillips Electrical Works, $106,889; Federal Wire and Cable Co., $20,700; General Electric, $18,975; Canada Wire and Cable, $12,880. *For ordnance*, Dominion Rubber, $135,675. *For dockyard stores*, Gutta Percha and Rubber Co., $6,427.

Heads New Sole Company

Alfred A. Curtis, formerly connected with the Lima Cord Sole & Heel Co. in an executive capacity, has organized the Cord Products Corporation in Franklin, Mass. Mr. Curtis is president and treasurer of the new company, which occupies a factory with 35,000 square feet of floor space, and Max Brown, formerly associated with the Hazen-Brown Co., sole manufacturers, is assistant treasurer. The new firm will manufacture and sell soles made under a newly-perfected process. This process uses cast-off tires, unfit for servicing or retreading. The rubber is burnished off down to the fabric of the tire and the fabric part is then flattened out. The sheets are then vulcanized together into blocks which can be sliced into any desired thickness from which the soles are ultimately cut.

Technical Bulletins Received

Several technical bulletins, referred to as "communications," have been received from the Rubber Research Institute of Malaya, which maintained headquarters at Kuala Lumpur in Malaya prior to the Japanese invasion. These include the following: *The Manuring of Centrosema Pubescens*, by R. A. Hamilton and K. S. Pillay (Communication No. 255); *The Viscosity of Preserved and Concentrated Latex, Part III*, by H. Fairfield Smith (Communication No. 256); *The Absorption of Water by Rubber, Part I*, by V. H. Wentworth (Communication No. 257); *Note on the Product of a Reaction between Aqua Regia and Latex*, by V. H. Wentworth (Communication No. 258); *Patent Specifications: Improvements in and relating to the Preparation of Softened Rubber* (Communication No. 259).

To Build Asbestos Factory

A new factory for the exclusive manufacture of improved types of asbestos yarns and fabrics will be constructed by the U. S. Rubber Co. in Hogansville, Georgia, according to H. Gordon Smith, general manager of the company's textile division. The new factory, to be erected on land owned by the company, is required to meet the rapidly growing demand for asbestos products, sold by the company under the trade-name of "Asbeston." U. S. Rubber has also purchased the plant of the Callaway Mills in Hogansville for the manufacture of duck for belting, hose and other mechanical goods, as reported elsewhere in this issue.

Plan Carbon Black Plant

According to report, Charles Eneu Johnson & Company, manufacturers of Atlantic carbon black, are planning the construction of a new carbon black manufacturing plant near Orlando, Oklahoma. The same source reported that the plant will cost approximately $500,000 with equipment.

OBITUARIES

Morgan W. Jopling

Morgan W. Jopling, noted industrialist and chairman of the board of the New York Rubber Corporation, which he served as president until about eight years ago, died from shock and exposure at Port Jefferson, Long Island, N. Y., on February 3, after he fell from his yacht *Encore* into the icy waters of Port Jefferson Harbor.

Born in Marquette, Mich., Mr. Jopling attended St. Mark's School in Southboro, Mass., and was graduated from Harvard in 1906. Later he studied at the Michigan School of Mines. During the first World War he was connected with the War Trades Bureau and later served as a lieutenant in the Army in Siberia.

In addition to his activities with the New York Rubber Corporation Mr. Jopling was president of Harrison White, Inc., chairman of the board of the MacArthur Concrete Pile Corp., president of Griplock, Inc., and Delft Theatres, Inc., and a vice-president of the Beebe Mfg. Co. He was also treasurer of the St. Johnland Home and a member of the Century Association.

Olin J. Garlock

Olin James Garlock, founder of the original Garlock Packing Co., died at his home in Palmyra, N. Y., on January 31 at the age of 81 after a brief illness of pneumonia.

Mr. Garlock was born at Phelps, N. Y. on July 5, 1861, and moved with his parents to Palmyra at the age of thirteen. He entered industry at an early age and shortly thereafter became a steam engineer for one of the local Palmyra concerns. It was during his work as a steam engineer that he conceived the necessity of successful packings, a work to which he applied himself for the greater portion of his life.

The first Garlock factory was started in 1889 and the business prospered and waned in succeeding years. In 1905 the company was incorporated but in 1929 the several owners of the enterprise sold their interests and Mr. Garlock had not been identified with the Garlock Packing Co. since that time. He subsequently became identified with the Crandall Packing Co., and continued his interest in that concern until it disbanded in 1938. He leaves two sons.

Roger N. Wallach

Roger N. Wallach, founder, president and a director of the Filatex Corporation, manufacturers of latex thread, with offices in New York City and a plant in Trenton, N. J., died at his home in Briarcliff Manor, N. Y., recently, at the age of 59. Mr. Wallach was also chairman of the board of the Sylvania Industrial Corp., which he also founded. Prior to organizing the Sylvania concern, Mr. Wallach had been a vice-president of the former Grasselli Dyestuffs Corp. He leaves a widow and two daughters.

William J. Tompkins

William J. Tompkins, president of the American Rubber Products Company of New York City, one of the largest distributors of rubber tile and tiling in the country, using its own brand name, died at his home in Mount Vernon, N. Y., on January 25, at the age of 50. Mr. Tompkins was born in Indiana and was graduated from Purdue University. He leaves a widow and two daughters.

Edward A. Waldron

Edward A. Waldron, vice-president of the John Waldron Company of New Brunswick, N. J., well known to many rubber manufacturers, died on January 26 at his home in Highland Park, N. J., at the age of 74. Mr. Waldron was graduated from Rutgers University in 1888. He leaves a widow, two sons and two daughters.

Chart on Properties of Rubber

Some interesting data on the properties of rubber, intended for use by engineers, has been prepared in circular chart form by the British Rubber Publicity Association, 19 Fenchurch St., London, E.C. 3, England. Entitled "Rubber Data for the Engineer," the chart indicates basic properties of soft vulcanized rubber, hard rubber, and sponge and cellular rubber, including electrical properties, thermal properties, abrasion and corrosion resistance, energy absorption, mechanical properties and bonding characteristics. Several applications, intended to be representative rather than comprehensive, are also indicated on the chart, copies of which are free on request.

An amendment to the limitation order on the use of cellophane prohibits the use of cellophane in connection with rubber and rubber products including but not limited to ruber gloves, bathing caps, rubber bands, dress shield, jar rings, etc., but permits its use as a substitute for Holland cloth in the backing of retreading stocks for tires, as a protective cover for cement on tire reliners and patches, as a wrapping on friction and rubber tape, and on nipples.

Change Name of Smith Company

The name of the E. M. Smith Company, of 639 South Clarence St., Los Angeles, Calif., has been changed to that of the Grizzly Manufacturing Co. The company has featured the brand name of "Grizzly" for many years. No change in policy or personnel was made, according to W. G. L. Smith, vice-president. The company's brake lining division in its entirety has been moved to a new eastern plant, located at Paulding, Ohio. This plant, located 28 miles from Fort Wayne, Indiana, will be devoted to the manufacture of automotive products only. The Los Angeles plant will continue to manufacture oil well specialties, aircraft press pads and drop hammer rubbers, as well as other types of mechanical rubber goods.

Plan New Firestone Plant

Further expansion of the armament producing facilities of the Firestone Tire & Rubber Co. by the construction of another factory building was revealed last month by John W. Thomas, chairman of the board, in his report to stockholders. The new structure will have 100,000 square feet of floor space and will be devoted entirely to the company's war effort. Military restrictions do not permit the publicizing of products to be made in the new plant. Mr. Thomas also revealed that Firestone has taken charge of a new ordnance project, a bomb-loading plant which will shortly be constructed.

A.S.T.M. Meets on March 2-6

The 13th Spring Meeting of the American Society for Testing Materials and 1942 A.S.T.M. Committee Week will be held at the Hotel Cleveland, in Cleveland, Ohio, on March 2 to 6, inclusive. It is anticipated that committee meetings will extend throughout the five days of the week and in accordance with the practice of previous years the Spring Meeting will be held on Wednesday, March 4. Local arrangements are being handled by the Cleveland District Committee, of which Arthur W. Carpenter, manager of testing laboratories for the B. F. Goodrich Co., is vice-chairman.

Accelerator Z-51

A new ultra-accelerator, designated as Accelerator Z-51, has been introduced by the Advance Solvents & Chemical Corp., 245 Fifth Ave., New York Ctiy. The new accelerator is described as a zinc salt of a dithiocarbamate and is said to be prepared from bases never before utilized in the manufacture of accelerators. It is reported to offer the advantages of low cost, safe processing, rapid cure and good aging properties. It also finds use in latex compounding where it is said to be especially active at room and low temperatures.

NEW EQUIPMENT

New Twin-Arc Weather-Ometer

A new Twin-Arc Weather-Ometer, said to faithfully duplicate the action of outdoor weathering by combining the action of June sunlight, rain, heavy dew, and thermal shock, and reported to be a distinct improvement over previous models has been announced by the Atlas Electric Devices Co., 397 West Superior St., Chicago, Ill.

The new model, developed especially for those whose needs call for even more greatly accelerated test results, gives quicker test results by virtue of the increase of active light at the specimen and the coordination of thermal shock produced by cold water spray. It is equipped with a robot cycle meter governing the light and thermal shock periods automatically. The cycle can be modified for various materials, such as rubber, bitumens, paint, lacquer, varnish, plastics, fabrics, etc.

So automatic is the new model in operation that the manufacturers claim that no operator attention is required other than inspection of samples and reloading of the arc units once in each 24 hours. Strong claims are also made for the economical operation of the new Weather-Ometer, since the total cost of carbon and current consumption amounts to only $1.20 for a 24-hour day. All standard Weather-Ometers now in use can be converted economically into the new Twin-Arc testing unit.

New Rotary Type Control Switch

A new double-break, direct-acting rotary switch for the control of circuit breakers has been developed by the Roller-Smith Company, Bethlehem, Pennsylvania. The switches are insulated for 600 volts and have a continuous current carrying capacity of 10 amperes.

This switch is built up of units, each unit consisting of two single break contacts connected in series by means of a jumper. The switch has a spring return arrangement so that when the handle is released the switch returns to the "Off" position, opening the con-

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tacts. The handle is of the pistol grip type, facilitating operation of the switch.

A red and green target is furnished as a part of each switch to indicate the last position of the switch. For example, to operate the circuit breaker control switch in conjunction with indicating lamps, the switch is turned to the "Close" position, 45° clockwise. This operation closes the breaker and energizes the red lamp through a breaker auxiliary switch. When the handle is released, the spring return feature causes the switch to return to the "Off" position, opening the contacts. The red target shows that the last position was to close the breaker.

To trip the breaker, the switch is turned to the "Trip" position, 45° counter-clockwise. This brings up the green indicator and lights the green lamp through another auxiliary switch. If the breaker trips by some means other than by the switch the green lamp and the red target are seen at the same time. This indicates that the breaker tripped on some fault.

Distribution Unit for Network Systems

Especially designed for industrial plants using secondary network systems, a new air-cooled network distribution unit has been announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Penna.

Consisting of a high-voltage double-throw primary transfer switch, an air-cooled 3-phase transformer and network protector housed as a single unit, the assembly transforms power from the primary voltage to secondary grid voltage. Ratings are from 300 to 1000 kva on all standard voltages between 2300 and 13,800 with secondary voltages of 125/216 four wire, 226/460 four wire and 460 three wire.

Primary air-break switch opens the exciting current of the associated transformer and will withstand a short-circuit current of 10,000 amperes for two seconds without damage to its parts.

The three phase transformer is of the dry type, air-cooled and insulated with non-inflammable materials. It is designed to carry rated kva at normal voltage and frequency without exceeding 75° C rise above an ambient temperature of 40° C. High voltage windings are delta-connected with four 2½ per cent full capacity taps below normal; low voltage windings may be star or delta connected with no taps.

Network protector is the three-pole open type securely mounted in the low-voltage end of the unit housing and adequately spaced and barriered from all high-voltage circuits of the unit to permit inspection, test, and maintenance without danger.

Magni-Focuser Eye-Shade

A new type Magni-Focuser Eye-Shade, equipped with a pair of stereoscopic five-power magnifying lenses, which by a slight tilt of the head brings the subject into focus greatly magnified, has been introduced by the Edroy Products Co., 480 Lexington Ave., New York City. The wearer when not using the lenses can readily look beneath the shade with normal vision. Use of this new device also allows the user the use of both hands. The eye-shade is strongly made of plastic, affording protection to the eyes of the wearer from flying parts of steel or shavings of any kind.

The Sensational New

VULCANIZER INTERIOR PAINT

SAVE YOUR VULCANIZERS with *Bonnejohn Vulcanizer Interior Paint* an insoluble coating that gives lasting protection to fittings and vulcanizer interior surfaces.

Its formula represents the results of scientific experiments and contains materials that minimize sulphurous fumes and acid action as well as being anti-corrosive under high steam pressure.

Can be applied with a brush, spreads easily, has exceptional long lasting and adhesive qualities, seals perfectly requiring no preliminary preparation other than having surfaces clean before painting.

Recommended for carts, hangers, and door mechanism or any equipment used in the interior of vulcanizers, or any place in your plant where equipment needs protection against extreme corrosion.

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Books . . . .

RUBBER RED BOOK—1941 Edition
Directory of the Rubber Industry
Cloth Bound, $5.00

ANNUAL BIBLIOGRAPHIES OF RUBBER LITERATURE
Compiled by D. E. Cable, Ph.D.
For Years 1935, 1936, 1937, each, Cloth, $2.00
For 1938-1939, Cloth, $4.00

LATEX IN INDUSTRY
By Royce J. Noble, Ph.D.
Text Book on Latex. Price: $7.00

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932. Price: $15.00

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
By Frederick Marchionna
Bibliography of latex patents and literature from June, 1932 to January, 1937; rubber derivatives to January, 1937. Price: $20.00
(Combination Price, Vols. I, II and III: $30.00)

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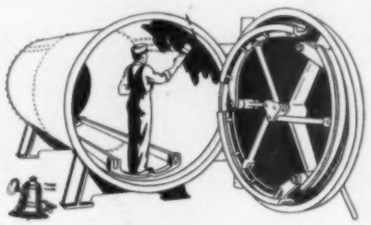
Bonnejohn Vulcanizer Interior Paint

The need for a paint with anti-corrosive properties for use on the interiors of vulcanizers and other equipment used in the rubber and other industries, to eliminate explosive hazards among other uses, is said to have been met by the introduction of Bonnejohn Vulcanizer Interior Paint by the Belke Manufacturing Co., 947 North Cicero Ave., Chicago, Ill.

The new paint is said to be composed of materials properly combined to be anti-corrosive under high



steam pressures and to minimize sulphurous fumes and acid action. It is applied with a brush, spreads easily and has adhesive qualities of its own so that no preliminary preparation of any kind is necessary except to have interior surfaces and fittings reasonably clean before the paint is applied.

According to the manufacturers, Bonnejohn Vulcanizer Interior Paint has been tested for durability and will not peel, crack or blister. It is also recommended for carts, hangers, inside vulcanizer door mechanism, as well as exhaust sewerage pipes, gaskets and other fittings subjected to oxidation.

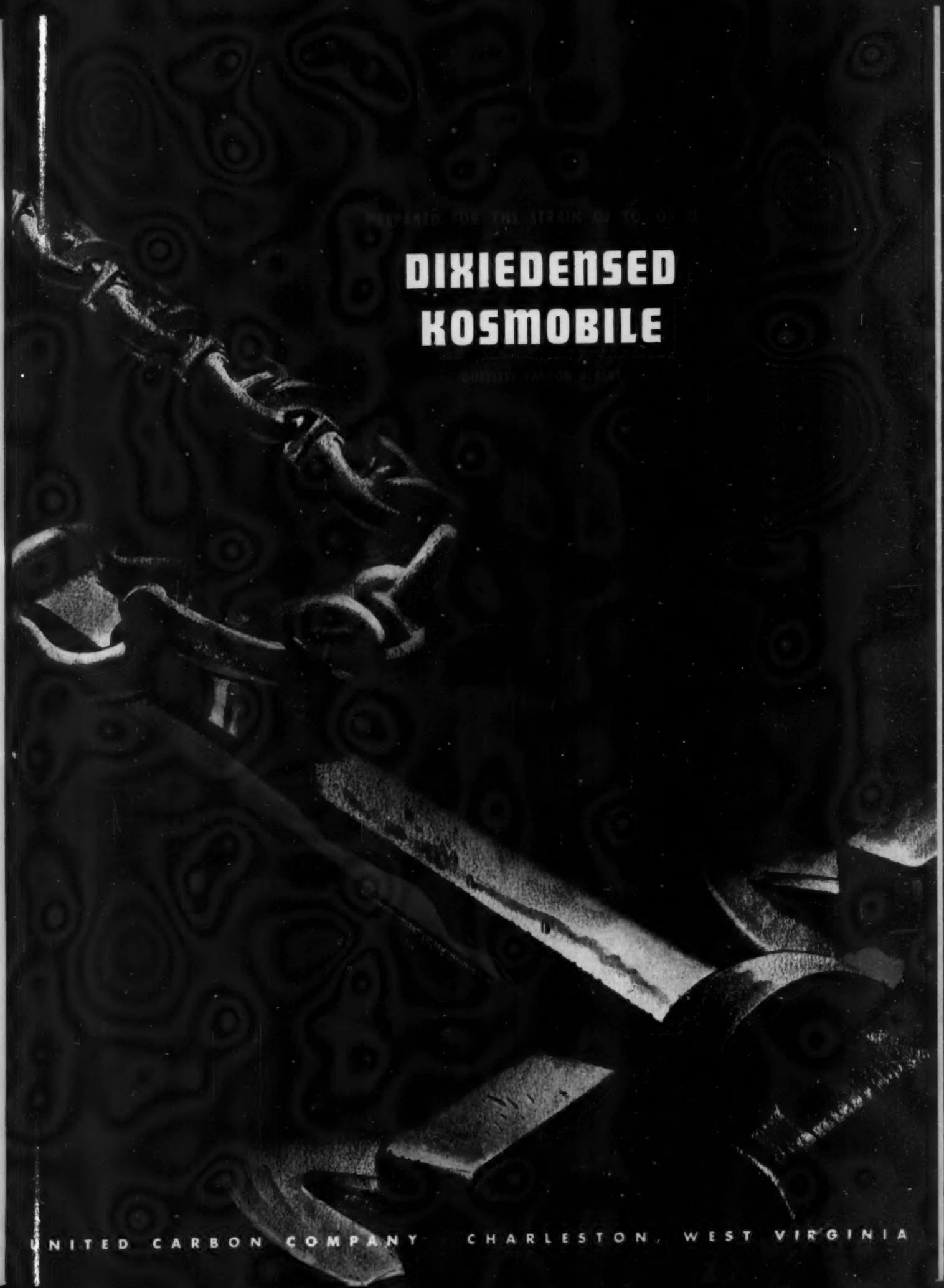
Simplified Signalling Controller

Dependable protection against damage caused by contaminated condensation in the industrial steam plant is said to be assured at exceptionally low cost by a new simplified signalling controller developed by the Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Penna.

Used where indicating and recording of condensate purity are not needed, this simple, automatic equipment tests condensate purity continuously. Its self-contained signal lights show whether condensate is above a specified minimum purity and is safe to use again, or whether it is below this limit and should be diverted to waste.

In addition, the instrument can operate external warning bells or lights. Or, it can provide automatic two-position control by regulating a motor-driven valve in the condensate line to dump impure condensate. If the operator wishes to measure condensate resistance, he can do so by turning the instrument's control-setting dial until both signal lights are out, and reading the dial scale.

Developed especially to speed production for all companies packaging their products in telescope type boxes, such as used by many rubber manufacturers, a **motorized box sealer** for use with Scotch Tape has been developed by the Minnesota Mining & Mfg. Co., St. Paul, Minn.



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BRIEFS . . .

A **black-out paint** for use in darkening windows and skylights of industrial and commercial properties where it would be impractical to extinguish lights at the sound of an air-raid warning has been announced by the American-Marietta Co., 43 E. Ohio St., Chicago. Termed Valdura Black-Out, the paint is being marketed in paste form and, when cut 50% with water, can be sprayed or brushed on windows. Coverage is 800 square feet to the gallon.

•

A new tamper-proof **photographic identification button** is now being manufactured by the Parisian Novelty Co., 3510 S. Western Ave., Chicago. The buttons, each of which is over 2 inches in diameter and contains room for a good sized photo of the worker by whom it is worn, are washable, durable, and unbreakable, in addition to being tamper-proof.

•

An extremely hard, abrasion resisting ceramic is now being used instead of metal for inserts of the **Long-Lyfe Nozzles** manufactured by the American Foundry Equipment Co., Mishawaka, Indiana. The new ceramic insert is claimed to have a hardness and density that is superior to many of the metals now being used for this purpose.

•

Quick, accurate and pleasing photographs may be taken at any industrial plant with the new **Ident-O-Graph** marketed by Photographic Equipment, Inc., 210 East Park Way, Pittsburgh, Penna.

•

Designed for blackout lighting in air raids, the **Wabash Blackout Bulb** has been introduced by the Wabash Appliance Corp., 335 Carroll St., Brooklyn, N. Y. The new bulb provides downlighting in a soft beam of blue light that is safe for indoor visibility during blackouts.

•

The **Little Giant Model** has been added to the line of drum and barrel carriers featured by the Ernst Magic Carrier Sales Co., Buffalo, N. Y. It was designed and constructed for handling litherage drums, which are principally used as containers of heavy materials.

•

A swiveling, positive, **self-aligning idler** for automatically correcting misalignment of either carrying or return runs of non-reversing conveyor belts supported on flat-roll idlers has been introduced by the Link-Belt Co., Indianapolis, Indiana.

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Springfield New Jersey

REVIEWS

BOOKS

Advances in Colloid Science. Vol. 1. Edited by E. O. Kraemer, in collaboration with F. E. Bartell and S. S. Kistler. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y. 6 x 9 in. 434 pp. 161 illustrations. $5.50.

This book, as indicated by its title, covers recent significant discoveries or advances in colloid science, either experimental or theoretical. It is the first of a planned series of volumes intended to provide a medium in which these advances will be presented in a more comprehensive and unified fashion than is possible in the regular technical periodicals. Reviews of developments in the various branches of the vast colloid field will be entrusted to technologists closely associated with and contributing to the technical knowledge of that field.

In the current volume, for example, twelve separate subjects are presented, titles and contributing authors being as follows:

The Measurement of the Surface Areas of Finely Divided or Porous Solids by Low Temperature Adsorption Isotherms, by P. H. Emmett.

The Permeability Method for Determining Specific Surface of Fibers and Powders, by R. R. Sullivan and K. L. Hertel.

A New Method of Adsorption Analysis and Some of Its Applications, by Arne Tiselius.

Solubilization and Other Factors in Detergent Action, by James W. McBain.

Recent Developments in Starch Chemistry, by Kurt H. Meyer.

Frictional and Thermodynamic Properties of Large Molecules, by R. E. Powell and Henry Eyring.

The Constitution of Inorganic Gels, by Harry B. Weiser and W. O. Milligan.

The Creaming of Rubber Latex, by G. E. Van Gils and G. M. Kraay.

Streaming Birefringence and Its Relation to Particle Size and Shape, by John T. Edsall.

Synthetic-Resin Ion Exchangers, by Robert J. Myers.

The Study of Colloids with the Electron Microscope, by Thomas F. Anderson.

Anomalies in Surface Tensions of Solutions, by Ernst A. Hauser.

The chapter on the creaming of latex, contributed by Messrs. Van Gils and Kraay, both associated with the Department of Rubber Research of the Experimental Station West-Java in Buitenzorg, includes data on creaming in actual practice, the creaming mechanism, factors affecting creaming, and recent research. The work of the authors in this field is especially stressed, with due note taken of contributions made by other latex technologists. Like all other chapters in the book, this chapter includes a comprehensive bibliography.

If this first volume is any criterion of others to follow in the series, then the entire series will prove most valuable to research and other workers in the field of colloid science. It has been well prepared, carefully edited, and has complete author and subject indexes.

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The Development of American Industries. (Revised Edition). Planned and Edited by John G. Glover and William B. Cornell. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York City. 6 x 9 in. 1006 pp. $5.50.

The first edition of this book, which traces the history, development and economical significance of thirty-nine American industries, was published in 1932 (see RUBBER

AGE, November 10, 1932, p. 108). Since that publication, social, economic and business changes have been so many and so varied that a revision was necessary. In the new edition, statistics have been brought up-to-date, changes in the status of industries are explained, the effects of legislative enactments are stressed, changes in methods of production are discussed, and new products are described.

Rubber is of course one of the industries reviewed. The chapter on rubber is contributed by A. L. Viles, president of the Rubber Manufacturers Association. In it, Mr. Viles traces the history of rubber, early beginnings in the United States, growth of the plantation industry, geographical location of rubber factories, methods of manufacturing, and methods of marketing. Statistics taken from the census of 1937 are included. Data on employment, capital investment and other factors is given. Two interesting charts are used, one showing the flow of materials in a rubber factory and the other showing the organization of a typical rubber company.

Industries covered in the new edition, in addition to rubber, include the following: Agricultural, Meat Packing, Fishing, Lumber, Pulp and Paper, Book Publishing, Newspaper, Textile, Cotton-Growing, Leather, Sugar, Petroleum, Coal, Iron and Steel, Copper, Lead, Zinc, Glass, Plate Glass, Cement, Chemical, Paint, Varnish and Lacquer, Machine Tool, Electrical, Power, Shipbuilding and Shipping, Railroad, Automobile, Aeronautical, Telegraph, Telephone, Motion Picture, Radio, Retailing, Hotel, Travel, and Banking. In addition, there is a chapter on Labor's Contribution to American Industries, prepared by William Green, president of the American Federation of Labor, and one on Trade Associations—Their Growth and Activities.

Although this book was developed primarily for use as a text in colleges of arts and sciences and in schools of commerce and business administration, it is of value to every business man in that it gives the history of the development and the economic significance today of many industries and cites practices which may well be adapted to any industry.

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Handbook of Chemistry and Physics. (25th Edition). Edited by Charles D. Hodgman. Published by the Chemical Rubber Co., 2310 Superior Ave., Cleveland, Ohio. 4½ x 7 in. 2500 pp. $3.50.

This latest edition of the handbook, which is revised annually to keep pace with research work, contains changes and revisions in a number of important classifications. For instance, the section on amino acids has been completely revised and enlarged in order to bring it wholly up-to-date; the collection of abbreviations and symbols has been completely revised; a table of natural secants and cosecants has been included in the mathematical section; tables covering a large range of values for the direct conversion of pressure in inches or centimeters of mercury to millibars have been included; the table of isotopes has been reset; a table on polarographic analysis has been added. These are only some of the many changes and additions made in the new edition. For the sake of convenience, the handbook is divided into five general divisions of subject matter, each separated by divisional guides, an outline of the contents of the section appearing on each guide. A complete subject index is included.

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Manufacture of Rubber Goods. By An Industrialist. Published in India. Available from the Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y. 4½ x 7¼ in. 158 pp. $1.50.

This book, published in India sometime in 1935 or 1936, was prepared for the primary purpose, according to its preface, of convincing industrialists in India that a rubber manufacturing industry could successfully be introduced in that country, even on a small scale if necessary. At the time the book was written, there were a few small rubber factories in the country producing a limited number of rubber products, and the author, who calls himself "an industrialist", intended to show

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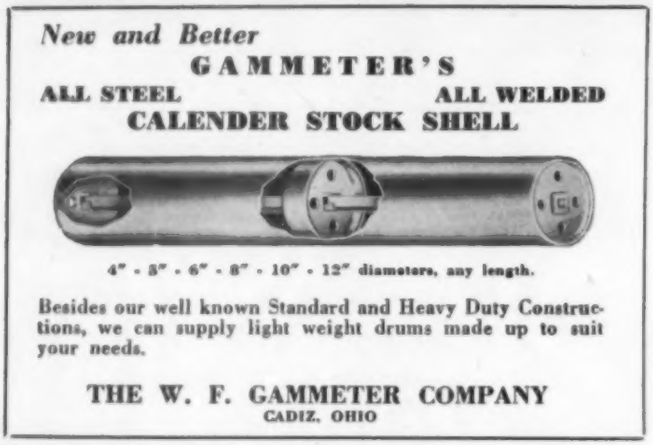
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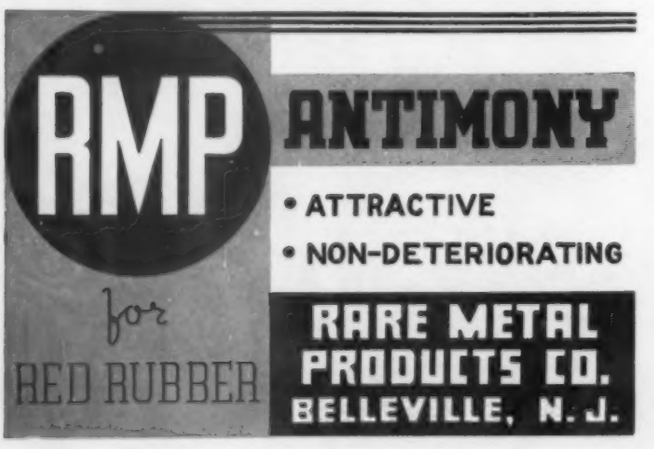

that a much greater variety could be produced. The author is quite frank to admit that he fell back on several technical books then available for his formulas and processes, but his selection of such books was unfortunately not of the best.

The book treats with the history of rubber, cultivation methods, species of rubber commercially available, properties and uses, preparation of compounds, vulcanizing, and methods of manufacture for various products. These products include balls, toys, tubes, tires, shoes, cements, balloons, erasers, heels, rollers, etc. Formulas are given in almost all cases, although few of them have any real value in modern compounding. The author has not attempted to go into too great detail on any one product, giving only surface fundamentals. While the book probably accomplished its aim insofar as India is concerned, it is of little value to the rubber student of today. This review of the book is being published so that it becomes part of the industry's record.

BOOKLETS, CATALOGS, Etc.

1942 Plastics Catalog. Published by the Plastics Catalogue Corp., 122 East 42nd St., New York, N. Y. 8½ x 11½ in. 622 pp. $5.00.

The second edition of this catalog, issued annually, brings the data on plastics completely up-to-date. Every section has been thoroughly overhauled, with the documented facts bolstered by new charts and informative illustrations. The complete story of the role of plastics in the war effort is given in a special section, which includes an informative discussion of how the industry is affected by priorities. Other sections are devoted to materials, plastics engineering, production operations, machinery and equipment, laminates and vulcanized fibres, plastic coatings, and synthetic fibres and rubbers. The Plastics Properties Chart, introduced in the first edition, has been revised and amended as have the charts on solvents and plasticizers. The section on synthetic rubbers contains descriptions of such products as Thiokol, neoprene, Ameripol, Hycar, Chemigum and Butyl Rubber, in addition to some of the rubber-like materials, such as Resistoflex, Koroseal and Vistanex. All in all, the catalog offers a wealth of information to anyone connected with or interested in the plastics industry in all of its many branches.

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Handbook of Dispersed Rubber (Latex, Lotol and Dispersite). Naugatuck Chemical Division of U. S. Rubber Co. and Dispersions Process, Inc., 1230 Sixth Ave., New York, N. Y. 9¾ x 11½ in. Looseleaf.

This handbook on latex and Lotol (compounded latex) sold by Naugatuck Chemical and Dispersite (a water dispersion of reclaimed rubber) sold by Dispersions Process, Inc., a wholly owned subsidiary of U. S. Rubber, contains information gained from practical experience with all three products over a period of years. It is divided into seven sections, separated by tabs for easy handling, the first of which briefly traces the history, sources, cultivation, preparation and uses of rubber, and the next three giving general information on latex, Lotol and Dispersite, respectively. The fifth section contains suggestions for the proper handling and storage of all three products, while the sixth consists of a number of catalog sheets furnished by various manufacturers describing machinery and equipment suitable for the manufacture of various products. Included in the latter section is a recommended list of books and periodicals on latex compiled by the staff of RUBBER AGE. The final section is devoted to miscellaneous data and includes several engineering tables. Supplementary data for inclusion in the handbook, which is a handy reference work on dispersed rubber, will be issued from time to time.

MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, FEBRUARY 10, 1942

Crude Rubber

STANDSTILL conditions were reached in the rubber trade last month with the latest regulations issued by the War Production Board banning all future trading in so-called "free" rubber. Under the terms of the regulations, incorporated in Amendment No. 3 to Supplementary Order No. M-15-b, no person shall sell, trade or transfer the ownership of any rubber or latex. This means that dealers are now restricted to the rules and regulations of the Rubber Reserve Co. As a result of the latest regulation, the Commodity Exchange, Inc., announced that trading in rubber futures had been suspended as of the close of business on February 6. A committee has been appointed to determine terms for the liquidation of open contracts, which number only 27 in all. Quotations fixed by the Rubber Reserve Co. and prices in the outside market follow:

As of February 10

Fixed Government Prices

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.22½
No. 2	—	@	.22¼
No. 3	—	@	.22
No. 4	—	@	.21¾
Thin Latex Crepe	—	@	.23 7/16
Thick Latex Crepe	—	@	.23 7/16
Brown Crepe, No. 1	—	@	.21 3/16
Brown Crepe, No. 2	—	@	.21 1/16
Amber Crepe, No. 2	—	@	.21 3/16
Amber Crepe, No. 3	—	@	.21 1/16
Brown Crepe, Rolled	—	@	.17 1/16

Latex—

Normal, carload lots, tanks	—	@	.2895
Normal, carload lots, drums	—	@	.3125
Conc., carload lots, tanks	—	@	.3065
Conc., carload lots, drums	—	@	.3250

Outside Market Prices

Paras—

Up-River, fine	—	@	.36
Acre Bolivian, fine	—	@	.36

Balata—

Brazilian block	—	@	.10

LONDON MARKET

(London Cable Temporarily Discontinued)

Tire Fabrics

Under existing conditions there is very little open demand for tire fabrics and, consequently, no specific prices are being quoted. The prices shown below are those which applied on or about January 15.

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.43½ @	.44
Peeler, carded, 23/4/3	lb.	.44½ @	.45
Peeler, carded, 15/3/3	lb.	.41½ @	.42
Peeler, carded, 15/4/2	lb.	.41½ @	.42
Peeler, carded, 13/3/3	lb.	.40½ @	.41

CHAFERS

Carded, American, 1 1/16"	lb.	.43½ @	.44
Carded, American, 1"	lb.	.39½ @	.48

Sheetings

48x40	36 in.	5.50	lb.	—	@ 7.546
40x40	36 in.	6.15	lb.	—	@ 6.748
40x36	36 in.	6.50	lb.	—	@ 6.385
48x48	40 in.	2.50	lb.	—	@15.600
48x48	40 in.	2.85	lb.	—	@13.684
56x60	40 in.	3.60	lb.	—	@11.528
48x44	40 in.	3.75	lb.	—	@10.666

Note: These are ceiling prices, and will remain as quoted as long as cotton is in the price range of 19.05 to 19.48 on coarse goods and 18.99 to 19.48 on fine goods.

Scrap Rubber

The expected order establishing maximum prices on scrap rubber was officially issued by the Office of Price Administration on February 4. The ceilings applied to various grades generally follow recent quotations, with allowances made for delivery to the various reclaiming points. In the meantime, scrap rubber dealers report that collections are showing some signs of improvement with considerable help in this direction expected in the near future as a result of the activities of salvage organizations set up in various centers throughout the country. Prices shown below are those listed in the O.P.A.'s Price Schedule No. 87:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	18.00
Beadless passenger tires	ton	24.00
Passenger S.A.G.	ton	18.50
Mixed truck tires	ton	18.00
Beadless truck tires	ton	24.00
No. 1 truck S.A.G.	ton	16.50
No. 2 truck S.A.G.	ton	16.50
No. 1 passenger peelings	ton	47.50
No. 2 passenger peelings	ton	30.00
No. 3 passenger peelings	ton	27.50
No. 1 truck peelings	ton	47.50
No. 1A truck peelings	ton	50.00
No. 2 truck peelings	ton	30.00
No. 3 truck peelings	ton	27.50
No. 1 light colored carcass	ton	52.50
No. 2 light colored carcass	ton	50.00
Gray carcass	ton	47.50
No. 2 passenger tubes	lb.	.07¼
No. 2 passenger tubes, lt. col.	lb.	.08¼
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06¾
Mixed passenger tubes	lb.	.06¾
No. 2 truck tubes	lb.	.07½
Red truck tubes	lb.	.07¼
Black truck tubes	lb.	.05¼
Two-toned black-gold tubes	lb.	.06¾
Two-toned red-black tubes	lb.	.06½

Closing Rubber Prices on N. Y. Commodity Exchange, Inc. Standard Contract of 10 Tons

FROM JANUARY 13 TO FEBRUARY 6

Date	March	Sales
Jan. 13	22.50	—
14	22.50	—
15	22.50	—
16	22.50	—
17	——	—
18	——	—
19	22.50	—
20	22.50	—
21	22.50	—
22	22.50	—
23	22.50	—
24	——	—
25	——	—
26	22.50	—
27	22.50	—
28	22.50	—
29	22.50	—
30	22.50	—
31	——	—
Feb. 1	——	—
2	22.50	—
3	22.50	—
4	22.50	—
5	22.50	—
6	22.50	—

Editor's Note: Trading in futures was suspended on the Exchange as of February 6. Outstanding contracts will be liquidated under terms now being considered by a special committee.

Cotton

The price of spot cotton has swung in a 138 point range since our last report, high being 20.96 on January 23 and low 19.58 on February 2. Prices were depressed in mid-January, largely as the result of liquidation on the part of speculators, but started an upward movement in the last week of the month, crossing the 20-cent mark on January 22 and reaching 20.96, high for the period, within the next few days. Persistent buying by trade and mill accounts, supplemented by moderate Wall Street support contributed to the advance, which carried futures to new highs since the latter part of 1929. A wave of selling was induced in the last few days of the month due to a statement by Secretary of Agriculture Wickard in which he argued for farm price levels around parity. President Roosevelt's subsequent statement that he was dissatisfied with the farm provisions of the price control bill which he signed served to through the entire trade into confusion and the price dropped to 19.58 on February 2, low for the period. It bounded back over the 20-cent mark again on February 6 but further recovery was stopped by the prediction of O.P.A. officials that the President would probably veto legislation which would prevent the Commodity Credit Corporation from selling its surplus stocks. Quotations on the Exchange for middling uplands follow:

	Jan. 12	February 10		
	Close	High	Low	Close
March	18.26	18.58	18.33	18.35
July	18.55	18.73	18.47	18.49
October	18.63	18.85	18.60	18.61

Reclaimed Rubber

The increased demand for reclaimed rubber experienced in recent months continued during the past several weeks, with reclaimers reporting demands from hitherto unexpected quarters. Efforts are being continued to increase the capacity for producing reclaim since with the stock situation taking a better turn in recent weeks still greater demands are expected in the future and will be filled to all intents and purposes. Current quotations, based on the ceiling prices now in effect, which provide for carload and less-than-carload lots, follow:

Shoe

Unwashed	lb.	.07 @	.07¼

Tube

Black Tube	lb.	.11¼ @	.11½
Red Tube	lb.	.12 @	.12¼

Tires

Black (acid process)	lb.	.07½ @	.07¾
Black, selected tires	lb.	.06½ @	.06¾
Truck, Heavy Gravity	lb.	.08½ @	.08¾

Miscellaneous

Mechanical blends	lb.	.04½ @	.05½
White	lb.	.13 @	.13¼

Ducks

Enameling (single filling)	lb.	.42 @	.44
Belting and Hose	lb.	.37½ @	.38
Single filling, A grade	lb.	.19 @	.20
Double filling	lb.	.20 @	.21

Note: These prices are nominal. Values are frozen at highest levels, Nov. 1 to Dec. 6, 1941.

CHEMICAL MARKETS

New York, Feb. 10, 1942
All Prices F.O.B. Works

ACCELERATORS

Organic

A-1 (Thiocarbanilid)	lb.	.26 @	.35
A-10	lb.	.34 @	.40
A-11	lb.	.52 @	.65
A-19	lb.	.52 @	.65
A-32	lb.	.70 @	.80
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.35 @	.60
Beutene	lb.	.60 @	.65
Butyl Zimate	lb.	— @	1.15
Captax	lb.	.50 @	.55
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.36
El-Sixty	lb.	.50 @	.65
Ethyl Zimate	lb.	— @	1.15
Ethylidene aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Guantal	lb.	.40 @	.50
Hepteen	lb.	.35 @	.40
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.15 @	—
Methyl Tuads	lb.	— @	1.55
Methyl Zimate	lb.	— @	1.25
Monex	lb.	— @	1.55
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	— @	1.90
R & H 50-D	lb.	.42 @	.43
R-2	lb.	1.40 @	1.80
R-2 Crystals	lb.	2.50 @	2.75
RN-2	lb.	1.40 @	1.80
RN-2 Crystals	lb.	1.90 @	2.15
Rotax	lb.	.60 @	.65
Safex	lb.	1.20 @	1.30
SPDX	lb.	.70 @	.75
Super-Sulphur No. 1	lb.	.50 @	—
No. 2	lb.	.14 @	.16
Thiocarbanilid, drums	lb.	.26 @	.35
Thiurad	lb.	— @	1.75
Trimene	lb.	.55 @	.65
base	lb.	1.05 @	1.20
Triphenylguanidine	lb.	.45 @	—
Ulto	lb.	1.25 @	1.75
Ureka	lb.	.60 @	.75
Blend B	lb.	.60 @	.75
Blend C	lb.	.56 @	.65
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—

Inorganic

Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Next Column)			
Blues [b]			
Prussian	lb.	.36 @	—
Ultramarine	lb.	.16 @	.27
Browns [b]			
Mapico	lb.	.11 @	—
Umber, Turkey	lb.	.04¾ @	.05⅞
Greens [b]			
Chrome	lb.	.23 @	.32
Guignet's Green	lb.	.70 @	—
Reds			
Antimony			
crimson, 15/17	lb.	— @	—
sulfur, free	lb.	— @	—
Indian	lb.	.08¾ @	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.09¼ @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¼ @	—
Whites			
Cryptone No. 19	lb.	.05¼ @	.05½
Cryptone CB No. 21	lb.	.05¼ @	.05½
Cryptone ZS-86	lb.	.07¾ @	.08
Cryptone ZS-230	lb.	.07¾ @	.08
Cryptone ZS-800	lb.	.07¾ @	.08
Lithopone:			
Albalith	lb.	.0385 @	.0410
Azolith	lb.	.0385 @	.0410
Ray-bar	lb.	.05½ @	.05¾
Ray-cal	lb.	.05½ @	.05¾
Rayox	lb.	.14½ @	.15¼
Titanox A	lb.	.13½ @	.13¾
Titanox B	lb.	.05½ @	.05¾
Titanox C	lb.	.05¼ @	.05½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06¼ @	.06¾
Anaconda, lead free	lb.	.06½ @	.06¾
Horsehead Lead Free Brand:			
Special—3	lb.	.06½ @	.06¾
XX Red—4	lb.	.06½ @	.06¾
XX Red—72	lb.	.06½ @	.06¾
XX Red—103	lb.	.06½ @	.06¾
Kadox, black label—15	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06½ @	.06¾
green label	lb.	.06½ @	.06¾
red label	lb.	.06½ @	.06¾
U. S. P.—7, bbls.	lb.	.09½ @	.09¾
Zinc Oxide—French Process:			
Florence White Seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows [b]			
Cadmolith	lb.	.50 @	.55
Chrome	lb.	.16 @	—
Mapico	lb.	.06¾ @	—

BLACKS

(In bags, carload lots)

Aerfloted Arrow		.0355 @	—
Certified		.0355 @	—
Certified Spheron		.0355 @	—
Continental		.0355 @	—
Disperso		.0355 @	—
Dixiedensed		.0355 @	—
Dixiedensed 66		.0355 @	—
Excello		.0355 @	—
Furnex		.03½ @	.06
Furnex Beads		.03½ @	.06
Gastex		.03½ @	.06
Kosmobile		.0355 @	—
Kosmobile 66		.0355 @	—
Kosmos-Dixie 20	lb.	.03½ @	.06
Micronex (Amarillo)		.0355 @	—
Micronex Beads (Amarillo)		.0355 @	—
Pelletex		.03½ @	.06
P-33		.0475 @	—
Shell Carbon (Del. Midwest)		.024 @	—
Supreme		.0355 @	—
Thermax		.0225 @	—
Wyex		.0355 @	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@24.50
Asbestine	ton	16.50	@20.00
Barium carbonate (98-100%)	ton	47.00	@49.00
Barytes	ton	25.35	@36.00
Bentonite	ton	11.00	@16.00
Blanc fixe, dry	ton	60.00	@67.50
Calcene	ton	37.50	@43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.00	@60.00
heavy	ton	45.00	@55.00
Clay, Aerfloted, Suprex	ton	10.00	@22.00
Crown (f.o.b. plant)	ton	10.00	@ —
Dixie	ton	11.00	@23.50
Langford	ton	— @	8.50
McNamee	ton	10.00	@22.50
Par	ton	—	@11.00
Witco	ton	10.00	@ —
Cotton Flock (Dark)	lb.	.10½ @	.13
Kalite No. 1	ton	26.00	@52.00
Kalite No. 3	ton	36.00	@62.00
Kalvan	ton	100.00	@126.00
Magnesium carbonate	lb.	.09 @	.10
Mica	ton	35.00	@44.00
Mineralite	ton	—	@30.00
Pyrax A	ton	7.50	@20.00
Rottenstone (powd. Dom.)	ton	25.50	@37.50
Rubberol	lb.	.16 @	.16½
Silene (calcium silicate)	lb.	.04 @	.045
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	17.00	@25.00
Whiting, commercial	ton	16.00	@26.00
Columbia Filler	ton	9.00	@14.00
Witco	ton	6.00 @	—
Wood Flour (100 mesh)	ton	30.00	@32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	22.00 @	—
Black Diamond	ton	25.00 @	—
Genasco, solid (factory)	ton	— @	—
Hard Hydrocarbon	ton	25.00 @	42.00
Parmr, solid	ton	— @	—
Pioneer, MR. solid	ton	— @	—

MISCELLANEOUS

Aromatics—Rodo #0	lb.	4.00 @	4.50
Rodo #10	lb.	5.00 @	5.50
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors	lb.	4.50 @	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.30 @	.39
Santomerse S (dispersing, wetting, penetrating and stabilizing agent)	lb.	.11 @	.25
Sponge Paste	lb.	— @	.18
Sunproof	lb.	.23 @	.28
Tackol (tackifier)	lb.	.085 @	.18
Tonox	lb.	.52 @	.61
Ty-Ply R (and S)	gal.	6.75 @	8.75
Unicel (blowing agent)	lb.	.50 @	—

SOFTENERS

Acids			
Acetic, 28%, bbls. [a]	100 lb.	3.38 @	3.63
Nitric, 36 degrees	cwt.	5.00 @	—
Acids, Fatty			
Laurex	lb.	.15 @	.17½
SL 210	lb.	.12 @	.14
Stearex Beads	lb.	.10 @	.11
Stearic, double pressed	lb.	.12½ @	.13½
Stearite	lb.	.10 @	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70 @	5.70
Soda Ash, 58%	cwt.	1.15 @	2.98
Oils			
Cycline Oil	gal.	.14 @	.20
Degras, bbls.	lb.	.10½ @	.12½
Fluxrite	lb.	.05½ @	.06½
Para-Flux	gal.	.08½ @	.18
Para-Lube	lb.	.425 @	.48
Petrolatum, amber [b]	lb.	.03½ @	.04½
Pigmentaroil, tank cars	gal.	.20½ @	—
in drums	gal.	.29 @	.30
Pine, steam distilled	gal.	1.00 @	—
Rosin Oil, cmpd.	gal.	.40 @	—
Rubberol	lb.	.13½ @	.14
Rubtack	lb.	.10 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	— @	—
Witco Softener No. 20	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.06 @	.06½
coal tar	ton	19.00	@22.00
hardwood	ton	16.00	@22.50
pine, 200 lb. gr. wt.	bbl.	6.00 @	6.50
Pigmentar, tank cars	gal.	.20½ @	—
in drums	gal.	.29 @	.30
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	gal.	.29 @	.30
Solvents			
Acetone, pure [a]	lb.	.07 @	.178
Benzene, 90%, tank car	gal.	.14 @	—
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.25
Carbon, bisulfide	lb.	.05 @	.08½
Carbon tetrachloride	gal.	.73 @	1.27
Dichlorethylene	lb.	— @	—
Dipentene, cml., drums	gal.	.48 @	.50
Ethylene dichloride	lb.	.07½ @	.08½
Plastogen	lb.	.07¾ @	.10
Reogen (drums)	lb.	.11½ @	.14
Rub-Sol	gal.	.09½ @	—
Trichlorethylene	lb.	.08 @	.09½
Turpentine, spirits	gal.	.82 @	.86
dest. dist., drums	gal.	.60 @	.65
Waxes			
Beeswax, white [b]	lb.	.56 @	.58
Carnauba, yellow [b]	lb.	.87 @	—
Ceresin, white, dom.	lb.	.13½ @	.15
Montan, crude	lb.	.45 @	.46
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04¼ @	—
Refined, 123/125	lb.	.05¼ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	2.00 @	2.15
Gel	lb.	.57 @	.59
Hipar	lb.	.65 @	.67
Powder	lb.	.52 @	.54
Resin	lb.	.52 @	.54
Resin D	lb.	.52 @	.54
White	lb.	1.25 @	1.40
Albasan	lb.	.70 @	.75
Antox	lb.	— @	.56
B-L-E	lb.	.52 @	.61
Flectol B	lb.	.52 @	.65
Flectol H	lb.	.52 @	.65
Flectol White	lb.	.90 @	1.15
Neozone A, B, C, D, E	lb.	.52 @	.63
Oxynone	lb.	.77 @	.90
Retardex	lb.	.45 @	.48
Santoflex B	lb.	.52 @	.65
Santovar A	lb.	1.15 @	1.40
S.C.R.	lb.	.33 @	.35
Stabilite	lb.	.52 @	.54
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.52 @	.61

LUBRICANTS—MOLD & RUBBER SURFACE

Aresklene	lb.	.35 @	.50
Cocoa Soapstock	lb.	.06 @	.08
Colite	gal.	.90 @	1.15
Dipex	lb.	.06 @	.08
Glycerized Liquid Lubricant	gal.	1.15 @	1.20
Lubrex	lb.	.25 @	.30
Mineralite	ton	— @	30.00
Mold Paste	lb.	.12 @	.18
Sericite	ton	65.00 @	75.00
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25 @	—
Amberex Type B	lb.	.18¾ @	—
Black	lb.	.08 @	.12
White	lb.	.08½ @	.13½
Brown	lb.	.08 @	.11½
Neophax A	lb.	.119 @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.08 @	.12
Sulfur Chloride, yellow (drs.)	lb.	.03 @	.08
Sulfur, rubber makers			
Refined (bags)	cwt.	2.40 @	—
Commercial (bags)	cwt.	2.05 @	—
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

STATISTICS

Crude Rubber — Latex & Guayule — Reclaim — Tires & Tubes — Automobiles — Rims — Gasoline — Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1938	397,620	125,357,730	14.07	5,652	1,799,124	14.21	391,968
1939	469,803	167,558,245	15.92	13,125	5,832,618	19.84	456,678
1940	780,820	303,117,726	17.33	7,060	3,197,136	20.22	773,760
1940:							
Sept.	75,770	29,317,540	17.27	666	349,443	23.43	75,104
Oct.	73,179	27,975,598	17.07	316	123,216	17.38	72,863
Nov.	69,844	26,917,136	17.21	126	52,020	18.45	69,718
Dec.	94,172	36,369,973	17.24	205	94,422	20.52	93,967
1941:							
Jan.	84,201	33,370,482	17.69	292	138,009	21.11	83,909
Feb.	70,745	28,469,753	17.97	327	144,139	19.69	70,418
Mar.	84,991	34,030,846	17.88	329	163,375	22.19	84,662
Apr.	61,288	24,193,639	17.62	238	99,371	18.96	61,054
May	98,438	39,537,574	17.93	370	204,865	24.72	98,068
June	62,124	25,179,498	18.09	476	257,254	24.13	61,648
July	94,622	39,296,581	18.54	423	219,597	23.17	94,199
Aug.	104,057	44,101,058	18.92	973	488,299	22.40	103,084
Sept.	79,212	33,045,295	18.62	749	402,036	23.96	78,463

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1924-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	...	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1938	2,485	623,819	509	181,140	9,132	2,944,504	11,878	4,147,318
1939	2,232	463,345	694	265,553	6,640	1,603,418	27,438	10,467,552
1940	3,634	758,007	648	300,500	7,451	2,449,137	33,789	14,593,466
1940:								
Sept.	250	49,845	40	19,245	712	246,641	2,953	1,337,487
Oct.	381	77,286	70	38,092	1,150	382,168	1,156	512,153
Nov.	392	78,587	67	43,939	445	152,297	2,308	1,169,086
Dec.	278	62,586	54	39,471	1,102	341,876	3,534	1,539,957
1941:								
Jan.	447	104,128	57	32,910	698	221,911	2,184	1,019,741
Feb.	283	65,942	41	22,790	768	245,732	2,946	1,279,648
Mar.	426	98,187	36	16,147	715	258,514	1,707	774,225
Apr.	423	95,916	64	18,533	514	189,520	1,594	648,217
May	334	76,414	61	44,381	822	287,249	2,632	1,117,226
June	383	86,949	67	30,470	552	179,779	2,070	936,944
July	411	94,874	100	34,119	830	215,176	2,049	930,126
Aug.	499	111,502	41	19,344	159	50,934	1,984	779,079
Sept.	330	79,054	114	38,632	437	140,412	3,609	1,795,345

(1) Weight given in pounds of dry rubber contained in latex.
Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Including Latex)

	Figures on Monthly Basis: 1934	1935	1936	1937	1938	1939	1940	1941
Jan.	39,190	46,636	48,631	50,879	31,265	47,387	58,061	65,989
Feb.	40,515	42,720	36,841	51,950	25,357	43,422	52,078	62,692
Mar.	47,003	42,153	42,813	54,129	32,389	51,416	52,454	69,024
Apr.	44,853	44,247	52,031	51,859	29,730	45,268	52,361	71,374
May	42,918	41,101	50,612	51,795	30,753	45,484	54,513	71,365
June	40,147	36,156	52,772	51,860	32,540	48,438	47,834	84,912
July	32,553	35,917	48,250	43,703	34,219	44,975	48,354	68,653
Aug.	33,216	38,775	46,777	41,506	40,552	51,740	53,307	55,365
Sept.	30,258	37,086	46,449	43,945	40,183	51,402	52,469	53,655
Oct.	31,253	41,969	49,637	38,754	42,850	57,155	59,644	60,418
Nov.	34,748	42,310	50,433	34,025	49,050	55,677	57,716	
Dec.	36,569	42,474	49,754	29,195	48,143	49,636	59,709	
Tot.	453,223	491,544	575,000	543,600	437,031	592,000	648,500	

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks	Year	Production	Consumption Tons	Consumption % to Crude	Stocks
1931	129,690	123,000	35.1	21,714	1936	150,571	141,486	24.6	19,000
1932	75,656	77,500	23.3	16,334	1937	185,033	162,000	29.8	28,800
1933	93,587	85,000	21.2	17,780	1938	122,400	120,800	29.9	23,000
1934	108,162	100,855	22.3	20,000	1939	186,000	170,000	28.7	25,250
1935	122,948	117,523	23.9	17,000	1940	208,971	190,244	29.3	32,636
	Figures on Monthly Basis								
1940:									
Jan.	19,239	16,341	28.1	27,089	July	14,299	14,539	30.1	27,129
Feb.	17,938	15,629	30.0	27,962	Aug.	17,161	14,464	27.1	28,526
Mar.	17,182	16,200	30.9	27,524	Sept.	16,379	14,835	28.3	29,039
Apr.	16,518	16,573	31.7	26,492	Oct.	19,300	16,807	28.2	30,816
May	17,499	15,984	29.3	27,141	Nov.	17,636	16,312	28.3	31,459
June	16,581	15,163	31.7	27,701*	Dec.	19,239	17,397	29.1	32,636
1941:									
Jan.	20,413	19,086	28.9	33,380	July	23,111	21,725	31.6	36,751
Feb.	19,506	18,222	29.1	33,654	Aug.	24,111	20,864	38.7	39,099
Mar.	22,006	19,611	28.4	35,028	Sept.	24,678	24,032	44.8	38,055
Apr.	21,574	20,427	28.6	35,336	Oct.	26,560	25,009	41.4	38,604
May	22,775	21,405	30.0	35,871	Nov.	.....	.....	...	.....
June	23,790	22,559	26.6	36,265	Dec.	.....	.....	...	.....

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures. The annual figures are more accurate. Stocks shown are those on hand at the end of the indicated month or year.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1939*	1940	1941*		1939*	1940	1941
January	38,089	40,370	45,344	August	54,025	55,346	62,944
February	34,928	37,557	42,001	September	49,505	52,297	58,995
March	43,042	44,607	48,760	October	49,854	53,807	.....
April	44,264	47,683	55,154	November	47,407	49,074	.....
May	49,766	52,946	59,307	December	43,807	46,413	.....
June	50,133	55,459	58,360				
July	50,689	53,865	63,093	Total	555,509	589,424	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1929	24,141,502	1933	8,713,962	1937	22,257,798
1930	17,364,096	1934	12,255,118	1938	10,619,338
1931	11,253,800	1935	18,664,107	1939	17,471,914
1932	6,261,336	1936	20,789,504	1940	19,378,558
1941		1941		1941	
January ...	2,032,121	May	2,407,864	September .	1,811,267
February ..	2,131,211	June	2,308,986	October ...	2,023,781
March	2,665,961	July	2,061,144	November .	1,864,321
April	2,682,225	August	1,532,032	December ..	1,676,714

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

1939	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
October		20	19½	19½	19½	19½	19		19	19½	19½		19½	19½		19½	20½	20¾	20¼	20½	20¾		20¾		20½	20	20	19½			19¾
November		20¼	20¼	20½	19½	19½	19½		20¼	20½			20	20¼		20	20	20¼	20¼	20	20¼		20¼		20¼	20	20	20½			20¼
December		20		19½	19½	19½	19½		19¼		20⅛	20⅛	20¼			20¼		20¼	20¼	20¼							19¼				20
1940																																
January		19¼	19¼	19¼	19½	19⅜		19¼	19¼	19¼	19½	19½	19¼	19½		19⅜	19½	19¼	19¼	19¼	19¼	19⅜	18⅞	18⅞	18¾	18¾	18¾	18⅝	18⅝	18⅝	18⅛	19
February		18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18½		19	19⅛	18¾	19¼	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾
March		18¾	18¾	18½	18¾	18¾	18¾	18¾	18¾	18¾	18¾	18¾	19	18½		19	19⅛	19¼	19¼	20	21¼	23	23	23	23	23	23	23	23	23	21	19¾
April		19¼	19¼	18½	18¾	18¾	18¾	18¾	19	18¾	18¾	18¾	19	18½		19	19⅛	19¼	19¼	20	21¼	23	23	23	23	23	23	23	23	23	21	19¾
May		19¼	19¼	19¼	20	20	20	20	20	18¾	18¾	18¾	19	19		19	19⅛	19¼	19¼	20	21¼	23	23	23	23	23	23	23	23	23	21	19¾
June		21½	21½	20½	21¼	21¼	21¼	21¼	20½	20½	20½	20½	20½	20½		20½	20½	20½	20½	20½	21¼	22	22	22	22	22	22	22	22	22	22	21¾
July		22	21¾	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼		21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼
August		19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19½	19½	19¾		19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
September		19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾		19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
October		19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾		19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
November		20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼		20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼
December		20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼		20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼
1941																																
January		20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼		20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼	20¼
February		20¼	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾		19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾	19¾
March		21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼		21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼	21¼
April		22¼	22¼	22	22¼	22	22	22	22½	22¼	22	22	22¼	22¼		22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼
May		24	23¾	24	23¾	24	24	24	24¼	23¾	23¾	23¾	24¼	23¾		24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼	24¼
June		21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21¾	21½	21¾	21¾		21¾	21¾	21¾	21¾	21¾	21¾	22	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	22¼	21¾
July		23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼		23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼	23¼
August		23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾		23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾
September		23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾		23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾	23¾
October		24	24	24	24	24	24	24	24	24	24	24	24	24		24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
November		24	24	24	24	24	24	24	24	24	24	24	24	24		24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
December		24	24	24	24	24	24	24	24	24	24	24	24	24		24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
1942																																
January		24¼	—	—	—	24½	24½	24½	24½	24½	—	—	24½	2⁷⁄₁₆	24⅜	24⅜	—	—	24½	24	23⅞	24	24	—	—	23⅜	23	23½	23½	—	24	

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Markets)

Average Price per Pound for Years 1913-1932

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98
1915	65.85	1919	48.70	1923	29.45	1927	37.72	1931	6.17
1916	72.50	1920	36.30	1924	26.20	1928	22.48	1932	3.49
1917	72.23	1921	16.36	1925	72.46	1929	20.59	1933	5.96

Average Monthly Price per Pound Since 1933

	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	9.32	13.10	14.35	21.37	14.63	15.75	19.06	19.88
Feb.	10.45	12.92	15.48	21.33	14.71	15.93	18.83	20.43
Mar.	11.01	11.51	15.89	24.09	13.55	16.26	18.58	22.17
Apr.	12.10	11.55	15.98	23.44	11.84	15.87	19.16	22.74
May	13.26	12.05	15.62	21.14	11.57	16.07	21.21	23.90
June	13.51	12.57	15.85	19.29	12.37	16.37	22.20	21.88
July	14.60	12.10	16.49	18.86	15.37	16.51	21.12	22.19
Aug.	15.47	11.98	16.25	18.37	16.08	16.67	19.62	22.70
Sept.	15.36	11.55	16.46	18.55	16.15	21.24	19.28	22.57
Oct.	13.96	12.62	16.55	16.28	16.89	19.89	20.33	23.10
Nov.	13.04	13.15	17.97	14.60	16.24	20.21	21.04	25.14
Dec.	12.98	13.28	20.01	15.41	16.05	20.01	20.76	24.04
Average for Year	12.92	12.37	16.41	19.39	14.64	17.57	20.10	22.40

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1941 May	1941 June	1941 July	1941 Aug.	Day	1941 May	1941 June	1941 July	1941 Aug.
1	14	—	—	—	16	14 7/8	—	—	—
2	14	—	—	—	17	—	—	—	—
3	—	13 7/8	—	—	18	—	—	—	—
4	—	13 7/8	—	—	19	14	—	—	—
5	—	13 3/4	—	—	20	13 7/8	—	—	—
6	—	13 3/4	—	—	21	13 7/8	—	—	—
7	—	—	—	—	22	13 7/8	—	—	—
8	—	—	—	—	23	13 1/2	—	—	—
9	—	—	—	—	24	—	—	—	—
10	—	—	—	—	25	—	—	—	—
11	—	—	—	—	26	13 1/4	—	—	—
12	—	—	—	—	27	13 1/8	—	—	—
13	—	—	—	—	28	13 1/8	—	—	—
14	—	—	—	—	29	13 1/8	—	—	—
15	14	—	—	—	30	13 3/8	—	—	—
					31	—	—	—	—

Note: No quotations have been made on the London Exchange since June 6.

Average Monthly Price Per Pound

Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence	Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence
Jan.	7.077	7.926	11.793	12.415	Aug.	7.841	8.545	12.818	
Feb.	7.029	7.942	12.577	12.769	Sept.	7.918	9.634	11.964	
Mar.	6.590	8.120	11.651	13.967	Oct.	8.355	10.177	11.813	
Apr.	5.793	7.910	10.980	14.228	Nov.	8.111	11.210	11.801	
May	5.632	8.002	11.600	13.670	Dec.	8.005	11.559	11.963	
June	6.147	8.216	13.046	—	Average for Year	7.164	8.959	12.035	
July	7.464	8.271	12.410	—					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1941 Dec.	1942 Jan.	1942 Feb.	Date	1941 Dec.	1942 Jan.	1942 Feb.	Date	1941 Dec.	1942 Jan.	1942 Feb.
1	17.52	—	—	11	18.03	—		22	18.28	20.28	
2	17.57	18.99	19.58	12	18.03	19.74		23	18.31	20.59	
3	17.87	19.13	19.74	13	17.87	19.61		24	18.34	20.58	
4	18.03	—	19.87	14	—	19.62		25	—	—	
5	18.24	19.17	19.97	15	17.99	19.74		26	18.24	20.87	
6	18.16	19.23	20.07	16	18.18	19.68		27	18.25	20.96	
7	—	19.23	20.01	17	17.99	19.71		28	—	20.44	
8	18.23	19.21	—	18	17.99	—		29	18.40	20.49	
9	17.85	19.32	20.14	19	18.08	19.71		30	18.59	20.49	
10	17.61	19.36	19.92	20	18.14	19.85		31	18.55	20.10	
				21	—	19.92					

Average Monthly Price Per Pound

	1938 Cents	1939 Cents	1940 Cents	1941 Cents		1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	8.57	8.94	11.19	10.66	Aug.	8.41	9.30	9.84	17.06
Feb.	8.91	8.97	11.10	10.87	Sept.	8.17	9.30	9.69	17.94
Mar.	8.92	9.00	10.90	11.08	Oct.	8.61	9.24	9.62	17.31
Apr.	8.76	8.87	10.89	11.48	Nov.	9.08	9.73	9.97	17.21
May	8.50	9.56	10.33	12.97	Dec.	8.72	10.97	10.18	18.09
June	8.38	9.88	10.72	14.66	Average for Year	8.66	9.46	10.40	14.66
July	8.85	9.71	10.42	16.55					

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of	ON HAND 1939	1940	1941	AFLOAT 1939	1940	1941	TOTAL 1939	1940	1941
Jan.	220,727	139,304	309,411	48,210	90,285	153,169	268,937	229,589	462,580
Feb.	207,882	129,023	320,372	55,814	112,257	136,955	263,696	241,280	457,327
Mar.	201,752	134,871	338,147	55,981	113,619	140,228	257,733	248,490	478,375
Apr.	188,074	152,645	329,767	57,918	102,557	153,484	245,992	255,202	483,251
May	187,980	148,881	359,234	54,046	109,364	147,459	242,026	258,245	506,693
June	173,493	154,313	339,108	51,274	119,138	175,499	224,767	273,451	514,607
July	165,450	175,455	395,216	52,990	139,629	132,304	218,440	315,084	527,520
Aug.	152,029	194,760	446,008	66,717	141,286	90,591	218,746	336,046	536,599
Sept.	136,824	220,597	473,684	68,310	137,888	141,756	205,134	358,485	615,440
Oct.	119,404	235,353	454,711	100,500	166,837	172,633	219,904	402,190	627,344
Nov.	105,205	250,412		114,044	158,095		219,249	408,507	
Dec.	125,800	288,864		91,095	145,950		216,895	434,814	

Note: Above figures include stocks held by United States Government.

STOCKS OUTSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Singapore and Penang	Para and Manaos	United Kingdom	United States	Total
November	33,778	3,697	30,000*	276,943	344,418
December	26,773	2,165	35,000*	318,486	382,424
1941					
January	37,145	2,151	40,000*	309,411	388,707
February	46,888	2,510	40,000*	320,372	409,795
March	41,005	1,200	40,000*	338,147	420,352
April	42,065	2,205	40,000*	329,767	414,057
May	44,593	1,768	40,000*	364,107	450,485
June	43,263	915	40,000*	339,108	423,286
July	41,534	1,063	40,000*	395,216	477,813
August	44,920	1,145	40,000*	446,008	532,073
September	32,997	1,772	40,000*	473,684	548,453
October	48,399	2,048	40,000*	454,711	545,158

* Estimated.

STOCKS INSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Malaya	N.E.I.[1]	Ceylon [1]	Other *	Total
November	43,693	39,267	11,675	3,997	98,632
December	48,787	48,622	11,850	4,124	113,383
1941					
January	47,198	45,137	13,196	4,329	109,860
February	55,512	48,795	14,677	4,064	123,048
March	44,522	48,534	13,841	4,210	111,107
April	53,237	46,787	14,432	4,009	118,465
May	46,511	49,184	14,444	3,772	113,911
June	46,758	51,354	11,908	4,432	114,452
July	49,666	56,352	13,595	4,113	123,726
August	46,558	55,601	12,444	4,003	118,606
September	46,299	48,667	13,052	2,140	110,158
October	50,325	.....	14,366	3,961	.....

(1) Estates and Dealers. (*) Estimated.

RUBBER STOCKS AFLOAT

	Afloat for United States	Afloat for Europe	All Other Afloat	Total Afloat
End of: 1940				
August	141,286	55,000	53,714	255,000
September	137,033	60,000	67,967	265,000
October	166,837	60,000	38,163	265,000
November	158,095	60,000	31,905	250,000
December	145,950	60,000	44,050	250,000
End of: 1941				
January	153,169	60,000	51,831	265,000
February	136,955	60,000	48,045	245,000
March	140,228	60,000	59,772	260,000
April	153,484	60,000	61,516	275,000
May	147,459	60,000	47,541	255,000
June	175,499	60,000	39,501	275,000
July	132,304	60,000	47,696	240,000
August	90,591	60,000	.....	.....

Note: *Total Afloat* figures are estimated at 1½ months' world shipments by the International Rubber Regulation Committee. *Afloat for U. S.* is supplied by the Rubber Manufacturers Association. *Afloat for Europe* is estimated. *All Other Afloat* is determined by subtraction.

TOTAL WORLD STOCKS

At End of:	1936	1937	1938	1939	1940	1941
January	600,479	454,249	549,762	497,665	433,841	753,021
February	599,355	445,265	565,833	479,578	429,551	769,193
March	583,318	447,856	586,666	460,723	447,472	783,737
April	567,172	428,249	586,291	438,252	465,345	765,521
May	541,871	413,134	568,158	429,979	470,981	777,429
June	520,255	434,250	573,136	407,640	500,774	771,229
July	519,074	445,782	580,654	418,639	547,708	799,934
August	500,520	457,462	565,394	397,345	579,119	859,329
September	493,585	470,768	551,447	396,867	631,888	.....
October	486,159	479,398	540,976	413,274	651,775	.....
November	466,491	493,266	512,196	395,217	659,308	.....
December	466,576	545,533	482,852	391,125	702,089	.....
Monthly Avge.	528,738	460,022	555,280	427,192	543,321	.....

Note: Figures prior to 1941 represent principal world stocks only, as supplied by the Department of Commerce. Figures since 1941 represent total world stocks, as compiled by the Commodity Exchange, Inc.

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	13,437	13,355	11,376	15,565	7,314	13,946	14,896	16,333
Apr.-June	13,565	12,597	14,892	15,834	7,380	13,759	15,636	18,310
July-Sept.	9,822	11,312	14,914	12,207	10,794	15,182	13,877	15,191
Oct.-Dec.	10,406	12,099	14,858	9,704	12,360	14,726	14,777	11,765
Total	47,230	49,363	56,040	53,310	37,848	57,613	59,186	61,599

Shipment Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,730	11,154	10,554	14,143	7,388	12,445	12,791	15,263
Apr.-June	14,998	13,473	15,940	15,741	9,564	15,107	17,595	21,277
July-Sept.	11,648	13,489	14,037	13,106	11,243	15,791	12,904	17,120
Oct.-Dec.	9,310	12,066	12,855	10,495	12,098	14,165	15,484	12,519
Total	46,686	50,182	53,386	53,485	40,293	57,508	58,774	66,179

Inventory Figures [2]

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	11,651	11,675	8,762	12,004	10,547	9,963	10,789	10,149
Apr.-June	10,219	10,755	7,556	12,081	8,337	8,632	8,871	7,088
July-Sept.	8,419	8,288	8,690	11,200	7,859	8,080	9,837	5,170
Oct.-Dec.	9,455	8,196	10,717	10,383	8,166	8,665	9,127	4,417

Figures for Recent Months

	PRODUCTION 1939	1940	1941	SHIPMENTS 1939	1940	1941	INVENTORY [2] 1939	1940	1941
Oct.	5,392	5,077	4,834	5,161	5,525	5,867	8,382	9,410	4,123
Nov.	4,865	4,732	3,964	4,278	4,969	4,048	8,918	9,163	4,043
Dec.	4,469	4,991	2,967	4,727	4,991	2,604	8,665	9,127	4,417

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	12,823	12,553	11,891	15,831	7,314	12,383	12,801	15,349
Apr.-June	13,191	11,631	14,624	15,413	7,380	11,847	13,703	17,584
July-Sept.	10,321	11,270	15,320	12,038	10,794	13,118	12,425	13,884
Oct.-Dec.	9,891	12,425	15,201	9,092	12,360	13,300	13,308	10,591
Total	46,226	47,879	57,036	52,374	37,848	50,648	52,237	57,408

Shipment Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,640	11,252	11,367	14,606	7,387	11,422	11,683	14,265
Apr.-June	14,553	11,928	15,113	15,495	9,564	13,010	14,978	18,577
July-Sept.	11,545	13,251	15,069	12,901	11,243	13,449	11,344	15,499
Oct.-Dec.	8,306	11,636	12,874	9,765	12,099	13,309	14,209	11,358
Total	45,044	48,067	54,423	52,767	40,293	51,190	52,214	59,699

Inventory Figures [2]

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,244	10,406	8,660	11,993	10,547	8,752	8,110	8,069
Apr.-June	8,795	10,050	8,075	11,833	8,337	7,549	6,848	7,010
July-Sept.	7,639	7,565	8,595	11,326	7,859	7,206	7,970	5,467
Oct.-Dec.	9,180	8,231	10,945	10,312	8,166	7,306	7,017	4,678

Figures for Recent Months

	PRODUCTION 1939	1940	1941	SHIPMENTS 1939	1940	1941	INVENTORY [2] 1939	1940	1941
Oct.	5,008	4,548	4,137	4,948	4,876	5,143	7,279	7,648	4,448
Nov.	4,508	4,104	3,725	3,967	4,690	3,825	7,710	7,056	4,377
Dec.	3,784	4,656	2,729	4,394	4,644	2,390	7,036	7,017	4,678

[1] These figures are based on reports received from the Rubber Manufacturers Association. They are revised frequently and the latest available issue should be consulted for most reliable figures.

[2] Stocks held by manufacturers at end of period indicated.

Automobile Production

Year	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938	2,489,085	2,000,985	488,100	166,086	123,761	42,325	2,655,171
1939*	3,577,292	2,866,796	710,496	155,426	108,369	47,057	3,732,718
1940	4,469,354	3,692,328	777,026	222,984	110,126	112,858	4,692,338
1941	4,838,561	3,744,300	1,094,261	270,431	94,045	176,386	5,108,992
1941							
Apr.*	462,270	374,979	87,291	27,584	12,091	15,493	489,854
May	518,748	417,698	101,050	26,585	9,840	16,745	545,333
June	520,521	418,983	101,538	25,753	8,538	17,215	546,274
July *	444,241	343,748	100,493	24,654	3,849	20,805	468,895
Aug.	147,600	78,529	69,071	17,192	3,160	14,032	164,792
Sept.	234,255	167,790	66,465	14,496	2,548	11,948	248,751
Oct.	382,000	295,568	86,432	19,360	5,635	13,725	401,360
Nov.	352,347	256,101	96,246	21,545	7,003	14,542	373,892
Dec.	282,205	174,962	107,243	20,313	6,651	13,662	302,518

* Revised.

Note: U. S. figures represent factory sales; Canadian, production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA							NETHERLAND INDIES							
	Gross Exports	Imports	Net Exports	Ceylon	India & Burma	Sarawak	British North Borneo	Thailand	Java & Madura	Sumatra E. Coast	Other N.I.	Indo-China	Amazon Valley	All Other	World Total
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,536
1927	371,322	182,845	188,477	55,356	11,321	10,925	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	5,551	84,085	139,632	207,863	43,399	15,576	13,063	1,133,864
1938	526,911	156,101	370,810	49,528	15,178	17,792	9,512	41,080	57,526	94,501	145,909	58,518	14,618	12,920	887,892
1939	553,324	177,851	375,473	61,026	15,881	24,014	11,864	41,266	72,786	117,791	181,272	65,140	13,892	22,224	1,002,629

	British Malaya [1]	N.E.I.	Ceylon [2]	India & Burma [2]	North Borneo	Sarawak	Thailand	Indo-China	Oceania	Africa [3]	Liberia	South America	Mexico (Guayule)	Grand Total
1940	540,417	536,740	88,894	23,317	17,623	35,166	43,940	64,437	2,267	10,103	7,223	17,601	4,106	1,391,834
1940:														
Sept.	58,892	44,009	9,985	1,319	1,743	2,404	3,247	9,303	100	800	323	1,295	200	133,715
Oct.	52,767	50,139	8,127	1,841	1,693	2,564	3,355	2,082	200	800	600	1,860	200	126,228
Nov.	36,045	37,387	5,623	2,626	1,130	3,360	3,463	6,715	200	800	600	1,500	200	99,649
Dec.	56,263	35,325	10,700	3,405	1,028	3,520	5,343	9,000	200	600	813	1,427	392	128,216
1941:														
Jan.	37,804	58,593	7,859	1,486	2,085	2,445	2,137	9,058	333	667	750	2,103	288	125,608
Feb.	27,115	42,091	4,332	1,421	1,686	2,922	4,137	1,995	96	854	828	1,814	414	89,705
Mar.	56,651	53,233	6,073	1,770	1,154	3,726	5,712	6,286	117	636	958	2,835	355	139,506
Apr.	40,590	48,915	6,985	1,661	2,175	3,118	4,271	....	263	864	750	2,009	423	112,024
May	53,062	48,099	7,638	1,831	1,237	3,849	1,841	6,225	156	800	180	1,080	334	126,332
June	51,247	48,496	8,925	1,056	986	3,195	2,831	7,318	200	800	919	1,510	250	127,733
July	53,373	53,429	7,387	939	1,803	3,799	3,614	3,445	200	800	750	1,253	250	131,042
Aug.	46,404	51,890	9,081	725	1,812	3,086	4,852	6,496	200	800	750	1,288	250	127,634
Sept.	70,598	65,496	6,706	145	1,371	2,495	6,524	8,000	200	800	750	1,421	250	164,756
Oct.	31,101	54,038	8,315	1,563	2,264	3,044	3,074	6,000	200	800	750	2,149	250	113,548

(1) Including Brunei and Labuan; figures shown represent rubber which has actually been shipped and include rubber from the free stocks in Singapore and Penang. (2) Exports of domestic produce. (3) Exclusive of Liberia. Notes: Figures shown prior to 1940 were furnished by the United States Department of Commerce. Figures since 1940 were furnished by the International Rubber Regulation Committee, which accounts for the difference in the principal producing countries shown. Many figures for current months are provisional only and are later revised when more definite statistics are available. Therefore, it is suggested that figures from the most recent issue should be taken as more reliable.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	Total
1919	238,407	42,671	17,685	5,584	6,393	9,753	9,894	73	1,002	3,995	2,771	3,149	2,418	9	343,809
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	2,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	367	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	3,498	2,670	4,046	1,290	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,391	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,273	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	3,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	30,462	19,164	14,970	4,343	4,680	2,400	13,063	1,055,356
1938	406,343	133,079	59,660	90,200	25,696	45,836	28,170	25,650	11,944	11,309	5,092	16,034	2,400	9,936	871,349
1939	486,348				31,615	42,352			15,426	9,612	7,051				
1940	811,564														
1940:															
Feb.	41,797	7,500	5,000*	....	3,508	5,241	1,500*	2,000*	1,846	694	495	1,200*	200*	....	....
Mar.	58,302	14,200	5,000*	....	3,062	6,057	1,500*	2,000*	1,784	....	627	1,200*	200*	....	....
Apr.	70,135	16,400	5,000*	....	3,096	2,000*	1,500*	2,000*	1,612	....	....	1,200*	200*	....	....
May	50,610	10,000	5,000*	....	3,108	2,500*	1,500*	2,000*	2,128	....	....	1,200*	200*	....	....
June	53,266	9,500	5,000*	....	1,062	3,000*	1,500*	2,000*	1,181	....	....	1,200*	200*	....	....
July	69,496	19,500	5,000*	....	5,112	3,000*	1,500*	2,000*	1,902	....	....	1,200*	200*	....	....
Aug.	72,612	21,250	5,000*	....	4,605	4,500*	1,500*	2,000*	2,508	....	....	1,200*	200*	....	....
Sept.	78,306	23,940	5,000*	....	2,743	....	1,500*	2,000*	2,485	....	....	1,200*	200*	....	....
Oct.	74,400	.....	5,000*	....	3,336	....	1,500*	2,000*	590	....	....	1,200*	200*	....	....
Nov.	72,775	.....	5,000*	....	5,451	....	1,500*	2,000*	1,366	....	....	1,200*	200*	....	....
Dec.	97,794	.....	5,000*	....	7,437	....	1,500*	2,000*	721	....	....	1,200*	200*	....	....
1941:															
Jan.	86,541	.....	5,000*	....	6,290	....	1,500*	2,000*	1,065	....	....	1,200*	200*	....	....
Feb.	73,647	.....	5,000*	....	3,770	....	1,500*	2,000*	1,717	....	....	1,200*	200*	....	....
Mar.	86,794	.....	5,000*	....	3,879	....	1,500*	2,000*	3,486	....	....	1,200*	200*	....	....
Apr.	64,521	.....	5,000*	....	2,531	....	1,500*	2,000*	2,326	....	....	1,200*	200*	....	....
May	101,034	.....	5,000*	....	5,596	....	1,500*	2,000*	1,549	....	....	1,200*	200*	....	....
June	64,101	.....	5,000*	....	2,818	....	1,500*	2,000*	1,373	....	....	1,200*	200*	....	....
July	96,658	.....	5,000*	....	4,143	....	1,500*	2,000*	2,003	....	....	1,200*	200*	....	....
Aug.	105,556	.....	5,000*	....	10,683	....	1,500*	2,000*	1,251	....	....	1,200*	200*	....	....
Sept.	81,742	.....	5,000*	....	....	....	1,500*	2,000*	4,392	....	....	1,200*	200*	....	....

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

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MONSANTO CHEMICAL CO.
Rubber Service Dept.
1012 Second National Bldg., Akron, Ohio

AERO BRAND RUBBER CHEMICALS
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U.S.P. Technical and Special Grades
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STEAREX . . . CAKE or POWDER
STEAREX BEAD
Standardized Products for Rubber Compounding
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SOAPSTONE
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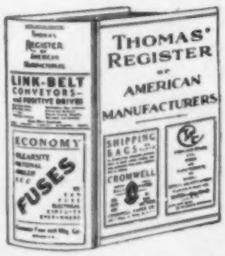

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